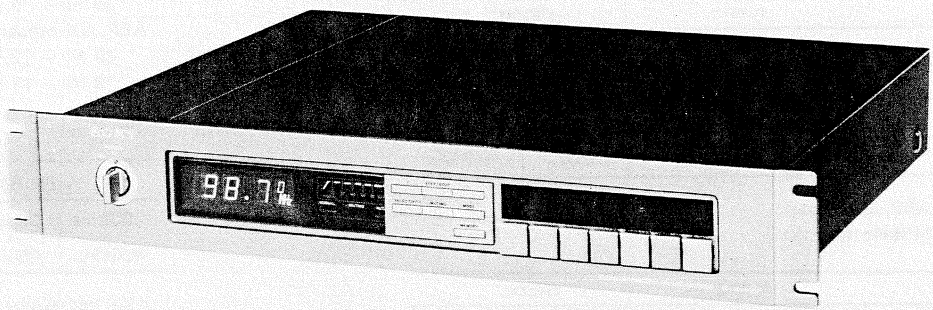
# ST-J88B

*US Model*
*AEP Model*
*UK Model*



## FM STEREO TUNER

### SPECIFICATIONS

#### GENERAL

**System:** PLL crystal locked digital synthesizer system

**Power Requirements:**
US model:
120 V ac, 60 Hz
AEP, UK model:
110, 120, 220 or 240 V ac ~ adjustable, 50/60 Hz

**Power Consumption:** 25 W

**Dimensions:** Approx. 480 (w) x 80 (h) x 370 (d) mm
19 (w) x 3¼ (h) x 14½ (d) inches
including projecting parts and controls

**Weight:**
US model:
Approx. 6.6 kg, 14 lb 9 oz (net)
Approx. 7.6 kg, 16 lb 13 oz (in shipping carton)
AEP, UK model:
Approx. 6.7 kg, 14 lb 12 oz (net)
Approx. 7.7 kg, 17 lb (in shipping carton)

#### TUNER SECTION

**Tuning Range:**
87.5 – 107.9 MHz (US model)
87.5 – 108 MHz (AEP, UK model)

**Antenna Terminals:**
300 Ω, balanced
75 Ω, unbalanced coaxial input

**Intermediate Frequency:** 10.7 MHz

**Sensitivity at 50dB Quieting:**
3.2 μV, 15.3 dBf (mono)
35 μV, 36.1 dBf (stereo) } (US model)

**Sensitivity at 46dB Quieting (40kHz deviation):**
3.2 μV (mono)
35 μV (stereo) } (AEP, UK model)

**Usable Sensitivity:**
US model:
1.8 μV, 10.3 dBf
AEP, UK model:
1.2 μV (S/N = 26 dB, 40 kHz deviation)
1.8 μV, 10.3 dBf (IHF)

— Continued on page 2 —

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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**Limiting Threshold:** 1 μV (AEP, UK model)

**S/N Ratio:**

| | US model | AEP, UK model (40kHz deviation) |
|---|---|---|
| mono | 80dB | 75dB |
| stereo | 75dB | 70dB |

**Harmonic Distortion:** US model:

| | mono | | stereo | |
|---|---|---|---|---|
| | NORMAL | NARROW | NORMAL | NARROW |
| 100Hz | 0.04% | 0.1% | 0.07% | 0.3% |
| 1kHz | 0.04% | 0.1% | 0.07% | 0.3% |
| 10kHz | 0.04% | 0.1% | 0.15% | 0.6% |

AEP, UK model:
(40kHz deviation)

| | mono | | stereo | |
|---|---|---|---|---|
| | NORMAL | NARROW | NORMAL | NARROW |
| 100Hz | 0.04% | 0.1% | 0.07% | 0.3% |
| 1kHz | 0.04% | 0.1% | 0.07% | 0.3% |
| 10kHz | 0.04% | 0.1% | 0.15% | 0.6% |

**IM Distortion:** US model:

| mono | | stereo | |
|---|---|---|---|
| NORMAL | NARROW | NORMAL | NARROW |
| 0.04% | 0.1% | 0.07% | 0.3% |

AEP, UK model:
(40kHz deviation)

| mono | | stereo | |
|---|---|---|---|
| NORMAL | NARROW | NORMAL | NARROW |
| 0.04% | 0.1% | 0.07% | 0.3% |

**Separation:**

| | NORMAL | NARROW |
|---|---|---|
| 100Hz | 50dB | 45dB |
| 1kHz | 50dB | 45dB |
| 10kHz | 45dB | 40dB |

**Frequency Response:** US model:
30 Hz – 15 kHz $^{+0.2}_{-0.5}$ dB
AEP, UK model:
40 Hz – 12.5 kHz ± 0.2 dB
30 Hz – 15 kHz $^{+0.2}_{-0.5}$ dB

**Selectivity:** US model:

| | NORMAL | NARROW |
|---|---|---|
| 300kHz | 25dB | 80dB |
| 400kHz | 65dB | ——— |

AEP, UK model

| | NORMAL | NARROW |
|---|---|---|
| 300kHz | 30dB | 85dB |
| 400kHz | 70dB | ——— |

**Capture Ratio:** 1.0 dB (NORMAL)
1.7 dB (NARROW)

**AM Suppression Ratio:** 60 dB

**Image Response Ratio:** 110 dB

**IF Response Ratio:** 110 dB

**Spurious Response Ratio:** 110 dB

**RF Intermodulation:** 80 dB

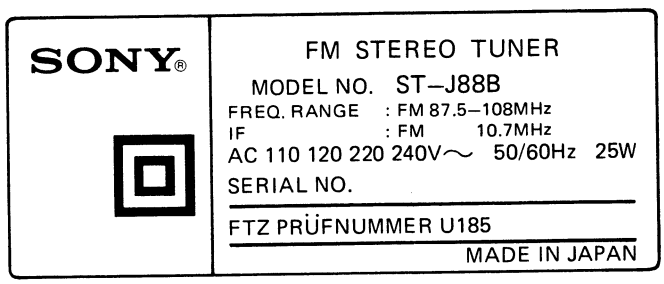
**Sub-carrier Product Ratio:** 70 dB (US model)
65 dB (AEP, UK model)

**Muting and Auto-tunig Threshold:** Approx. 5 μV, 19.2 dBf

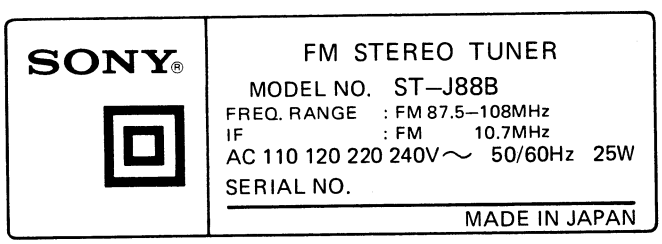
**Output Level:** FIXED: 750 mV, 2 kΩ
VARIABLE: 0 – 1.2 V, 470 Ω

## MODEL IDENTIFICATION
— Specification Label —

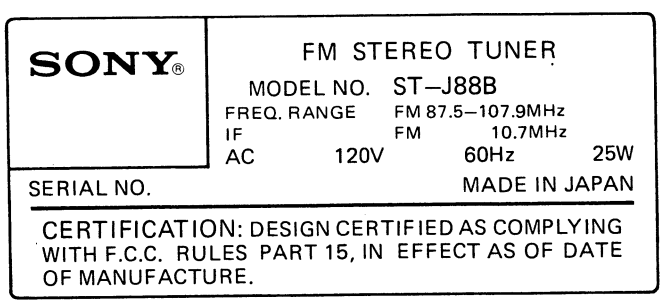
- AEP model




- UK model




- US model

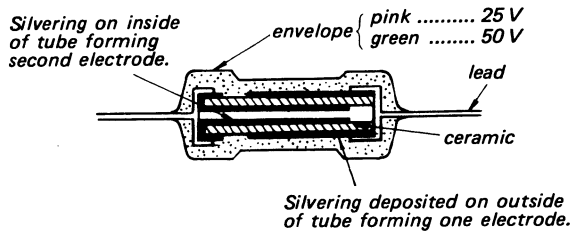

SONY
FM STEREO TUNER
MODEL NO. ST–J88B
FREQ. RANGE FM 87.5–107.9MHz
IF FM 10.7MHz
AC 120V 60Hz 25W
SERIAL NO.
MADE IN JAPAN
CERTIFICATION: DESIGN CERTIFIED AS COMPLYING WITH F.C.C. RULES PART 15, IN EFFECT AS OF DATE OF MANUFACTURE.

## THE CERAMIC CAPACITORS

This set uses tube-type ceramic capacitors whose shape is identical with the carbon resistors. Be careful not to use resistors instead of capacitors in repairing.

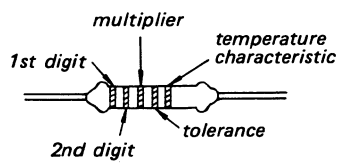
Disc-type ceramic capacitors can be used for replacing those originally used in the set.

Two kinds of drilled holes are provided in some patterns for mounting the tube-type and disc-type ceramic capacitors. Use appropriate holes where applicable.

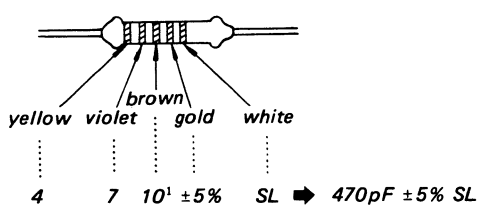

Silvering on inside of tube forming second electrode.
envelope
pink ..... 25 V
green ..... 50 V
lead
ceramic
Silvering deposited on outside of tube forming one electrode.

## COLOR CODE (in pF)

| Color | 1st or 2nd Digit | Multiplier | Tolerance | Temperature charac-teristic |
|---|---|---|---|---|
| brown | 1 | $10^1$ | | Y |
| red | 2 | $10^2$ | | D |
| orange | 3 | $10^3$ | | |
| yellow | 4 | $10^4$ | | RH |
| green | 5 | | | |
| blue | 6 | | | |
| violet | 7 | | | UJ |
| gray | 8 | | ±30% | X |
| white | 9 | | | SL |
| black | 0 | $10^0$ | ±20% | CH |
| gold | | $10^{-1}$ | ± 5% | V |
| silver | | $10^{-2}$ | ±10% | B |




**Example:**



## Handling Precautions for MOS ICs (IC106, 404–408, 502)

Generally, the insulation resistance of the oxide layer in MOS IC structures is very high, and the oxide layer is very thin. Because of this, it is possible that the static voltages usually present on clothes and the human body will be enough to generate a potential difference across the insulator, high enough to cause a breakdown of the insulating layer.

The following precautions should be taken while handling these ICs.

(Particular care should be taken under conditions of low humidity.)

### Precautions in Replacing MOS ICs

1. Store new ICs by inserting them into a urethane-polyester cushion (which is somewhat conductive), or wrapping it in aluminum foil, so that all the pins are at the same potential.
   (The ICs should be stored in that manner until mounted on the circuit board.)

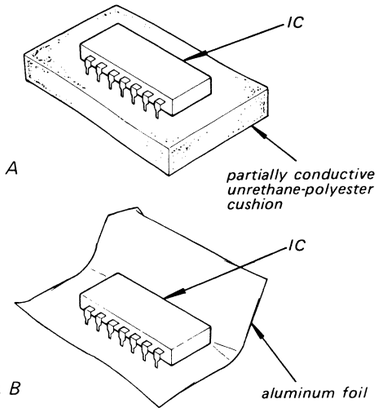



Fig. A

Fig. B

2. Check the soldering iron for possible power-line leakage current. Make sure that there is no leakage path by connecting an ohmmeter to the tip of the soldering iron and the plug as shown in Fig. C. If there is a leakage path, use some other soldering iron.

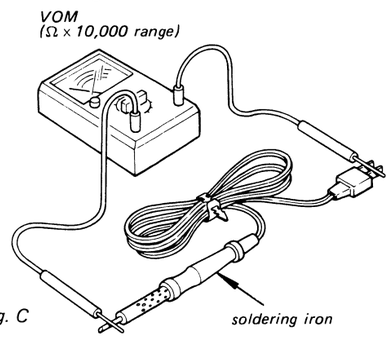



Fig. C

3. Equalize any potential difference between the clothes, the tools in use, the work bench, the set being worked on, and the packaged IC by touching them all in succession with the hands or a conductive wire or tool.

4. The following are effective methods for handling ICs that remove the potential difference across the oxide layer.
   - Use a paper clip modified by soldering in a wire braid insert.

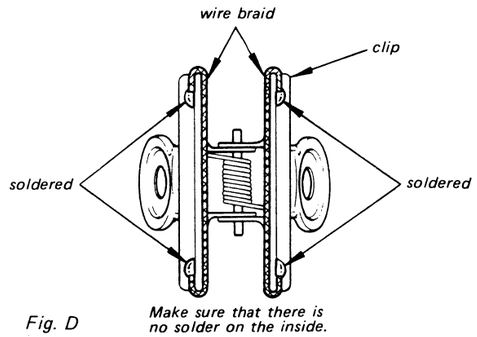



Fig. D

Make sure that there is no solder on the inside.

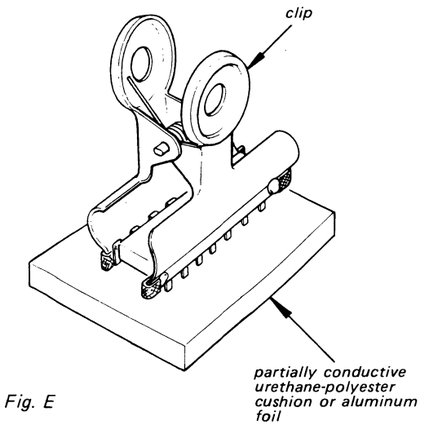



Fig. E

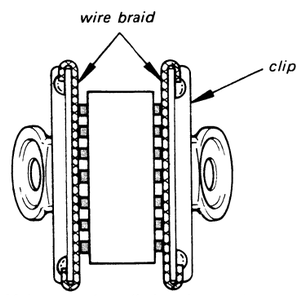



Fig. F

Make sure that all the pins are in contact with the wire braid (all the pins will then be at the same potential.).



- Take a short length of fine bare wire and wind it around the IC so that it shorts all the pins of the IC, while it is still in the urethane-polyester cushion or aluminum foil. This ensures that all the pins are at the same potential.

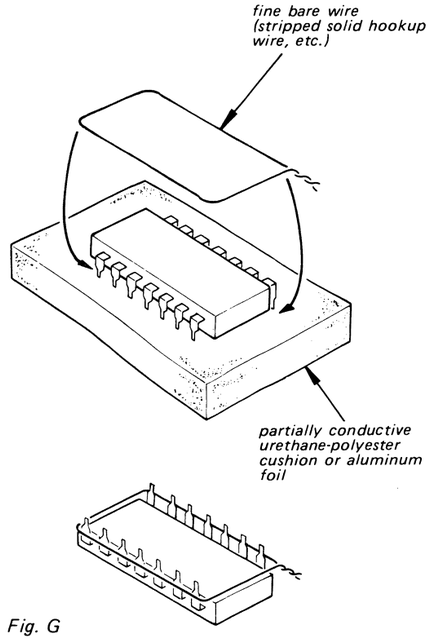



Fig. G

- When it is necessary to handle the IC with the fingers, do not touch any pin, and hold the IC at the ends of its plastic-package case as shown in Fig. H.

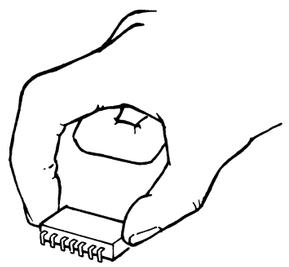


Fig. H

5. Method of Mounting
   Insert the IC while holding it with the modified clip, and solder all the pins with the clip still shorting the pins. (Similarly, solder all the pins while the bare shorting wire is still wound around them.). Remove the clip or the bare shorting wire only after all the pins have been soldered.

### Precaution while Checking C-MOS ICs

The C-MOS ICs (Complementary MOS) are MOS ICs that have their output sections made up of N-channel and P-channel push-pull stages to increase their speed of operation. If the output terminal of these ICs comes into contact with B+ or B– voltage, then the FET which is ON at that time will either become shorted or open.

This is valid for all the output sections that are connected together by the interconnections. Even the circuits that are physically separated (and not on the same board) can be destroyed simultaneously.

**Example:**

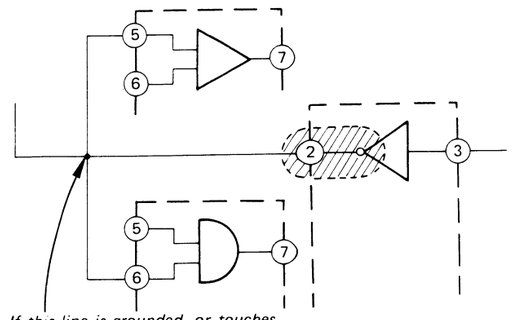
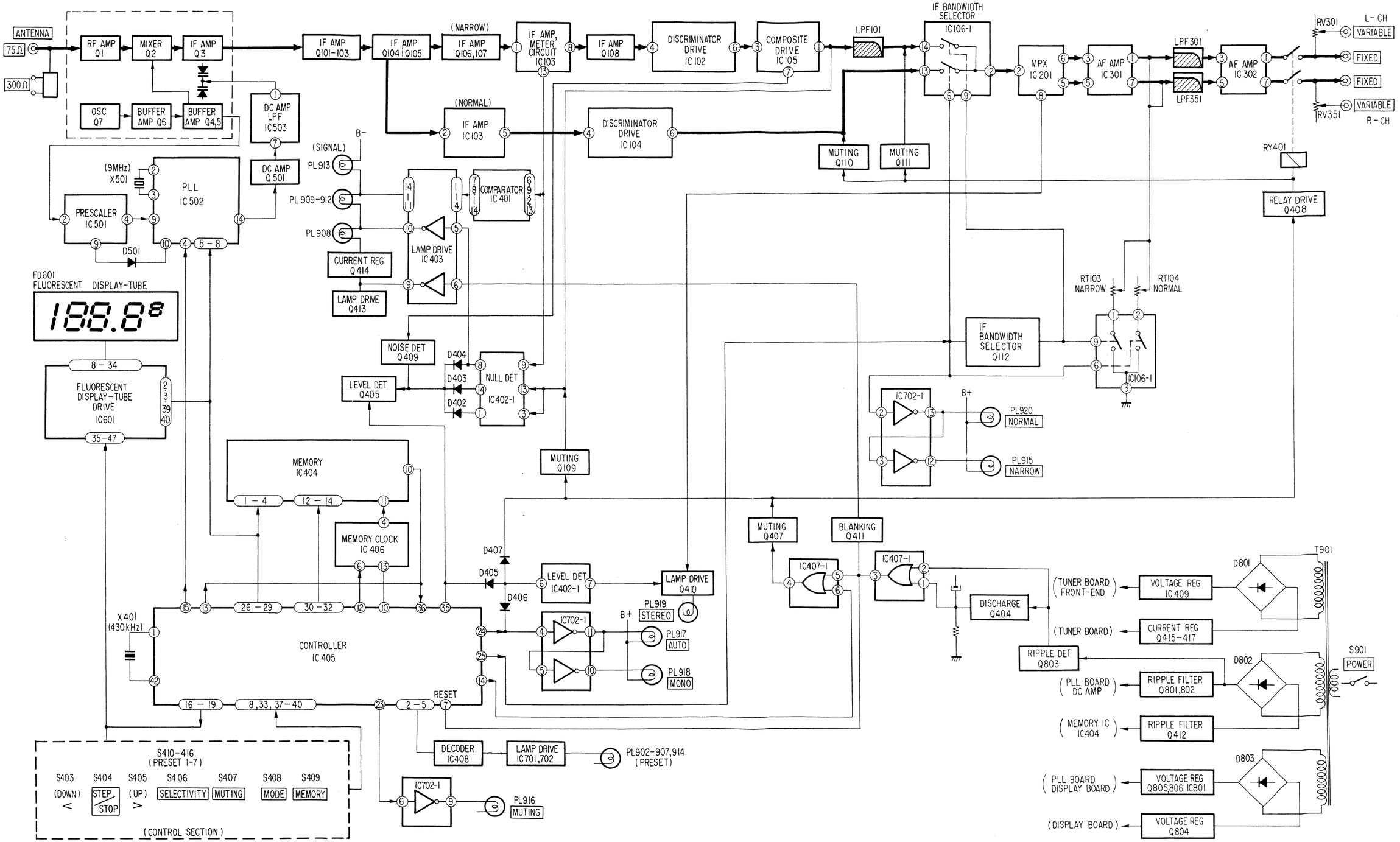



Fig. I

# SECTION 1
# OUTLINE

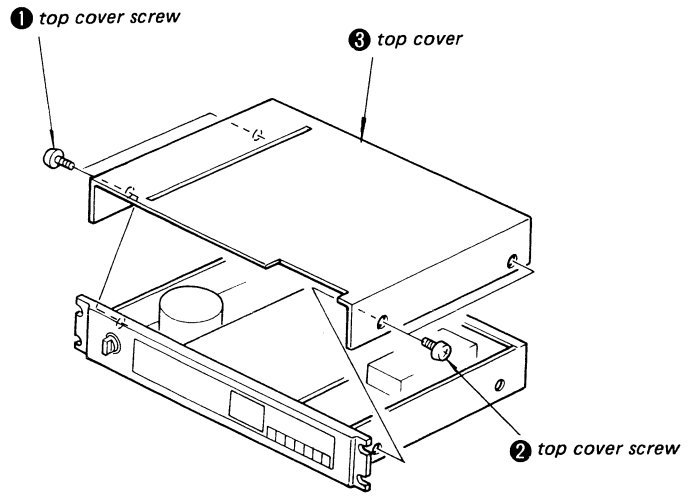
## 1-1. BLOCK DIAGRAM



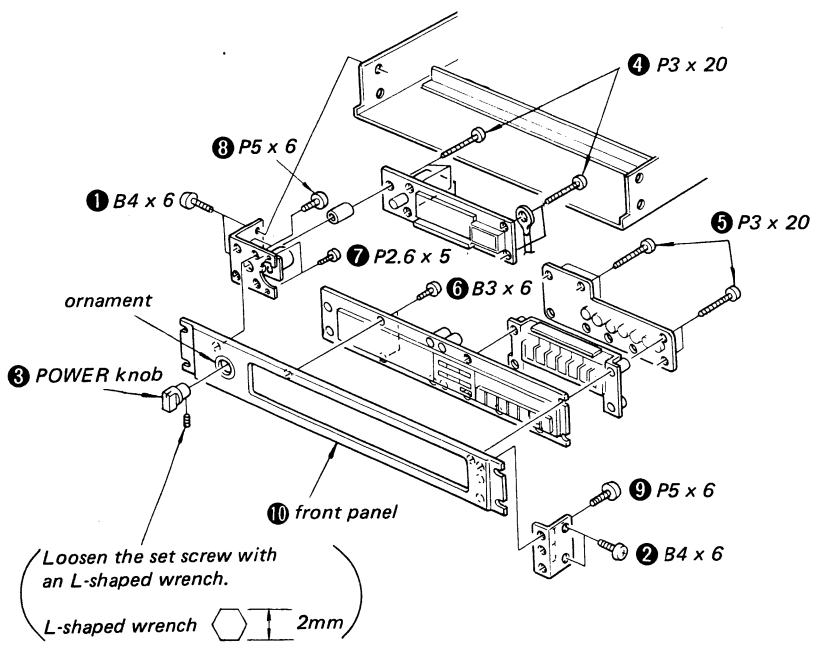
# SECTION 2
# DISASSEMBLY

**Note:** Follow the disassembly procedure in the numerical order given.

## TOP COVER REMOVAL



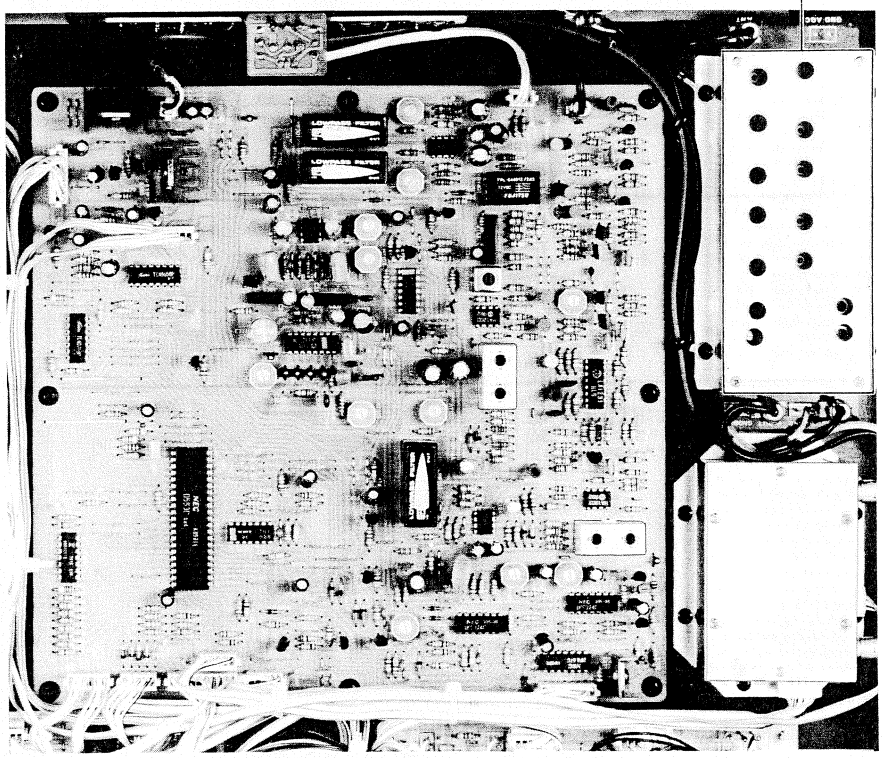

## FRONT PANEL REMOVAL



# SECTION 3
# ADJUSTMENTS

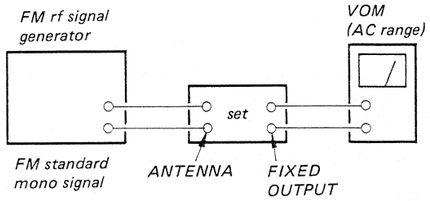
**Servicing Precaution**

The front-end section can not be repaired and it is only supplied as the front-end block.
This section has been carefully adjusted at the factory.



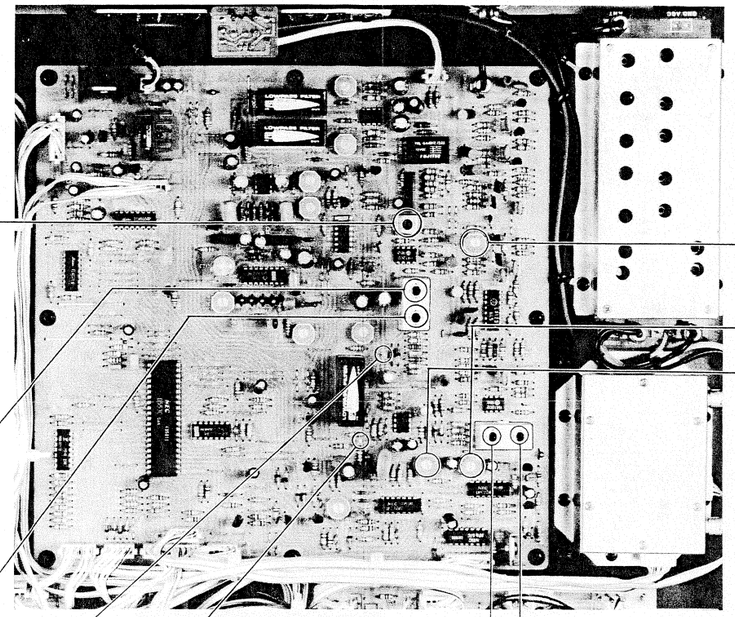
## Tuning Adjustment

Procedure:




*Output level: 2μV (6dB)*

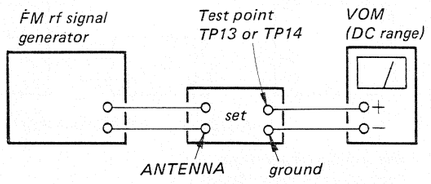
1. SELECTIVITY switch: NORMAL
   MUTING switch: OFF
2. Adjust IFT102 for maximum reading on the VOM.




## Discriminator Alignment

### A) Secondary Side

Procedure:



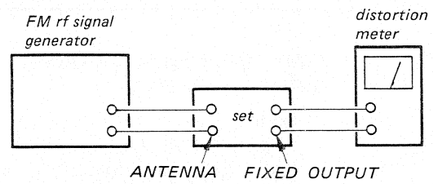

*Carrier frequency: 98.1MHz*
*Modulation: no modulation*
*Output level: 1mV (60dB)*

1. Connect the VOM to the test point TP13.
2. MODE switch: MONO
   SELECTIVITY switch: NARROW
3. Turn the core (secondary side: black) of IFT101 for 0V reading on the VOM.
4. Connect the VOM to the test point TP14.
5. SELECTIVITY switch: NORMAL
6. Turn the core (secondary side: black) of IFT103 for 0V reading on the VOM.

**Note:** Repeat the secondary side and primary side adjustments several times.

### B) Primary Side

Procedure:




*FM standard mono signal*
*Output level: 1mV (60dB)*

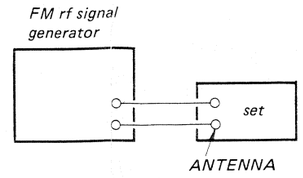
1. MODE switch: MONO
   SELECTIVITY switch: NARROW
2. Turn the core (primary side: orange) of IFT101 for minimum distortion reading on the distortion meter.
3. SELECTIVITY switch: NORMAL
4. Turn the core (primary side: orange) of IFT103 for minimum distortion reading on the distortion meter.

**Note:** Repeat the secondary side and primary side adjustments several times.



## Signal Indicator Adjustment

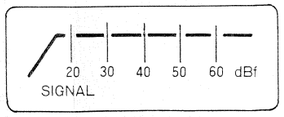
Procedure:




*Carrier frequency: 98.1MHz*
*Modulation: no modulation*

1. SELECTIVITY switch: NARROW
2.

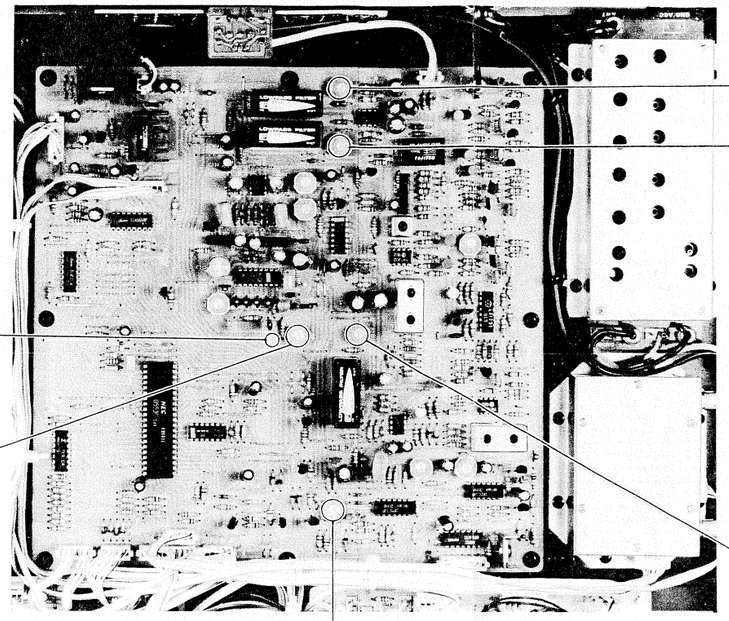
| FM rf signal generator output level | Indication | Adjustment part |
|---|---|---|
| 560μV (55dB) | The sixth lamp from the left lights up. | RT101 |
| 56μV (35dB) | The fourth lamp from the left light up. | RT401 |
| 5.6μV (15dB) | The second lamp from the left lights up. | RT402 |




*signal indicator*

| *FM Standard Mono Signal* | |
|---|---|
| *Carrier frequency:* | *98.1MHz* |
| *Modulation:* | *400Hz, 75kHz deviation (100%)* |
| | *. . . . . US model* |
| | *400Hz, 40kHz deviation (100%)* |
| | *. . . . . AEP, UK model* |

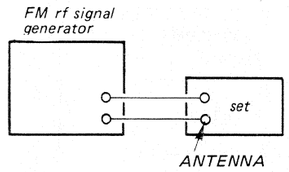
| FM Standard Mono Signal | |
|---|---|
| Carrier frequency: | 98.1MHz |
| Modulation: | 400Hz, 75kHz deviation (100%) |
| | ..... US model |
| | 400Hz, 40kHz deviation (100%) |
| | ..... AEP, UK model |



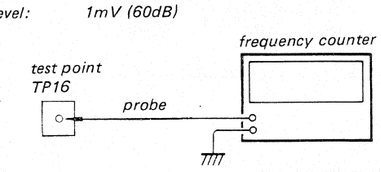

## 76kHz Adjustment

### A) Regular Method

Procedure:




*Carrier frequency:* 98.1MHz
*Modulation:* no modulation
*Output level:* 1mV (60dB)

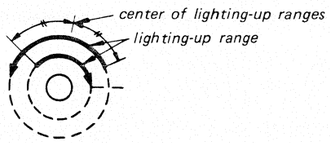



1. Tune the set to 98.1MHz.
2. Adjust RT202 for 76kHz ±50Hz on the counter.

### B) Simple Method

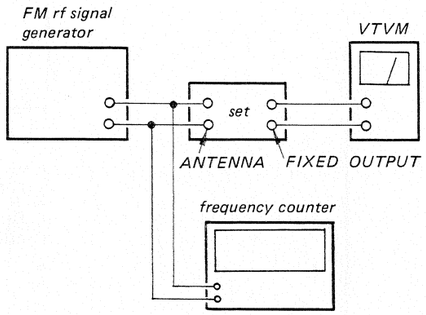
Procedure:

1. Tune the set to the FM stereo broadcasting signal.
2. Turn RT202 clockwise or counterclockwise and memorize the lighting-up range of the stereo lamp.
3. Secure RT202 at the center of the lighting-up range of both turns as shown below.




## Muting Range Adjustment

Procedure:

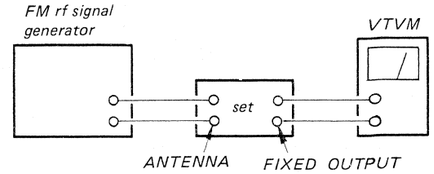



*Carrier frequency:* 98.1MHz
*Modulation:* 400Hz, 75kHz deviation (100%) (US model)
400Hz, 40kHz deviation (100%) (AEP, UK model)
*Output level:* 1mV (60dB)

1. SELECTIVITY switch: NARROW
   MUTING switch: ON
2. US model:
   Adjust FM rf signal generator for +70kHz (98.17MHz) on the frequency counter.
   AEP, UK model:
   Adjust FM rf signal generator for +30kHz (98.13MHz) on the frequency counter.
3. Adjust RT403 for 0V reading on the VTVM.

## Output Level Adjustment

Procedure:

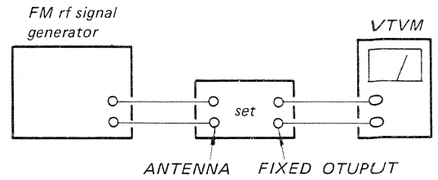



*FM standard mono signal*
*Output level: 1mV (60dB)*

1. SELECTIVITY switch: NORMAL
2. US model:
   Adjust RT301 (L-CH) and RT351 (R-CH) for 0.775V (0dB) reading on the VTVM.
   AEP, UK model:
   Adjust RT301 (L-CH) and RT351 (R-CH) for 0.42V (−5.5dB) reading on the VTVM.

## IF Bandwidth Selector Gain Adjustment

Procedure:




*FM standard mono signal*
*Output level: 1mV (60dB)*

1. MODE switch: MONO
   SELECTIVITY switch: NORMAL
2. Memorize the VTVM reading.
3. SELECTIVITY switch: NARROW
4. Adjust RT102 for the same reading as obtained in step 2.

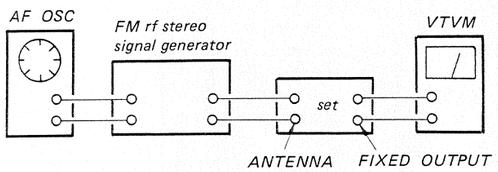
*FM Standard Stereo Signal*

*Carrier frequency: 98.1MHz*
*Modulation:*

| | | |
|---|---|---|
| *Audio (400Hz):* | *33.75kHz deviation (45%)* | *US model* |
| *Subchannel (38kHz):* | *33.75kHz deviation (45%)* | |
| *Pilot (19kHz):* | *7.5kHz deviation (10%)* | |
| *Audio (400Hz):* | *20kHz deviation* | *AEP, UK model* |
| *Subchannel (38kHz):* | *20kHz deviation* | |
| *Pilot (19kHz):* | *7.5kHz deviation* | |

**Stereo Separation Adjustment**

Procedure:




*FM standard stereo signal*
*Output level: 1mV (60dB)*

1. MODE switch: STEREO
   SELECTIVITY switch: NARROW

2.

| FM stereo signal generator output channel | VTVM connection | VTVM reading (dB) |
|---|---|---|
| L-CH | L-CH | Ⓐ |
| R-CH | L-CH | Ⓑ Adjust RT103 for minimum reading. |
| R-CH | R-CH | Ⓒ |
| L-CH | R-CH | Ⓓ Adjust RT103 for minimum reading. |

L-CH Stereo separation: Ⓐ – Ⓑ
R-CH Stereo separation: Ⓒ – Ⓓ

The difference between the separations of both channels should be within 2dB.

3. SELECTIVITY switch: NORMAL

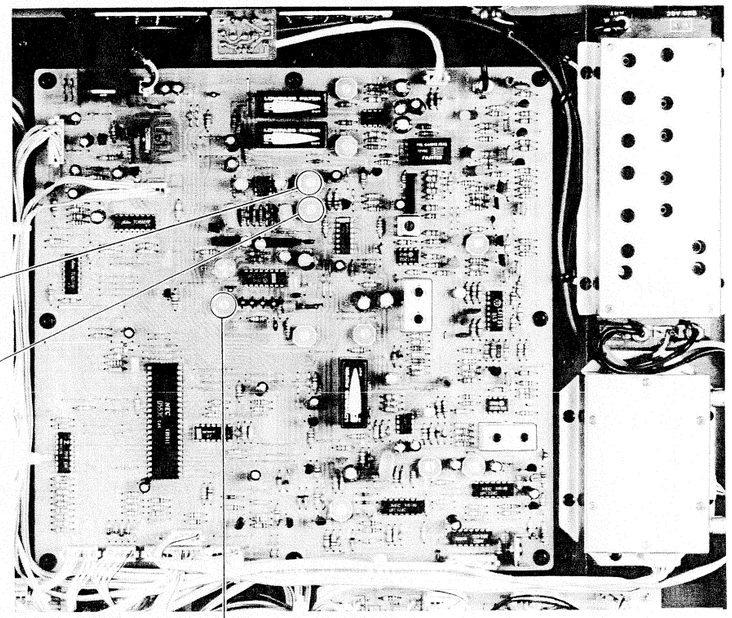
4.

| FM stereo signal generator output channel | VTVM connection | VTVM reading (dB) |
|---|---|---|
| L-CH | L-CH | Ⓐ |
| R-CH | L-CH | Ⓑ Adjust RT104 for minimum reading. |
| R-CH | R-CH | Ⓒ |
| L-CH | R-CH | Ⓓ Adjust RT104 for minimum reading. |

L-CH Stereo separation: Ⓐ – Ⓑ
R-CH Stereo separation: Ⓒ – Ⓓ

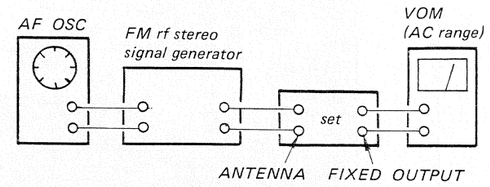
The separations of both channels should be equal.






**19kHz Cancel Adjustment**

Procedure:




*FM standard stereo signal*
*Output level: 1mV (60dB)*

1. MODE switch: STEREO
   SELECTIVITY switch: NORMAL
2. Remove AF OSC.
   (19kHz pilot signal is only supplied.)
3. Adjust RT201 for the same FIXED OUTPUT levels of both channels.

## 4-1. MOUNTING DIAGRAM (TUNER BOARD)

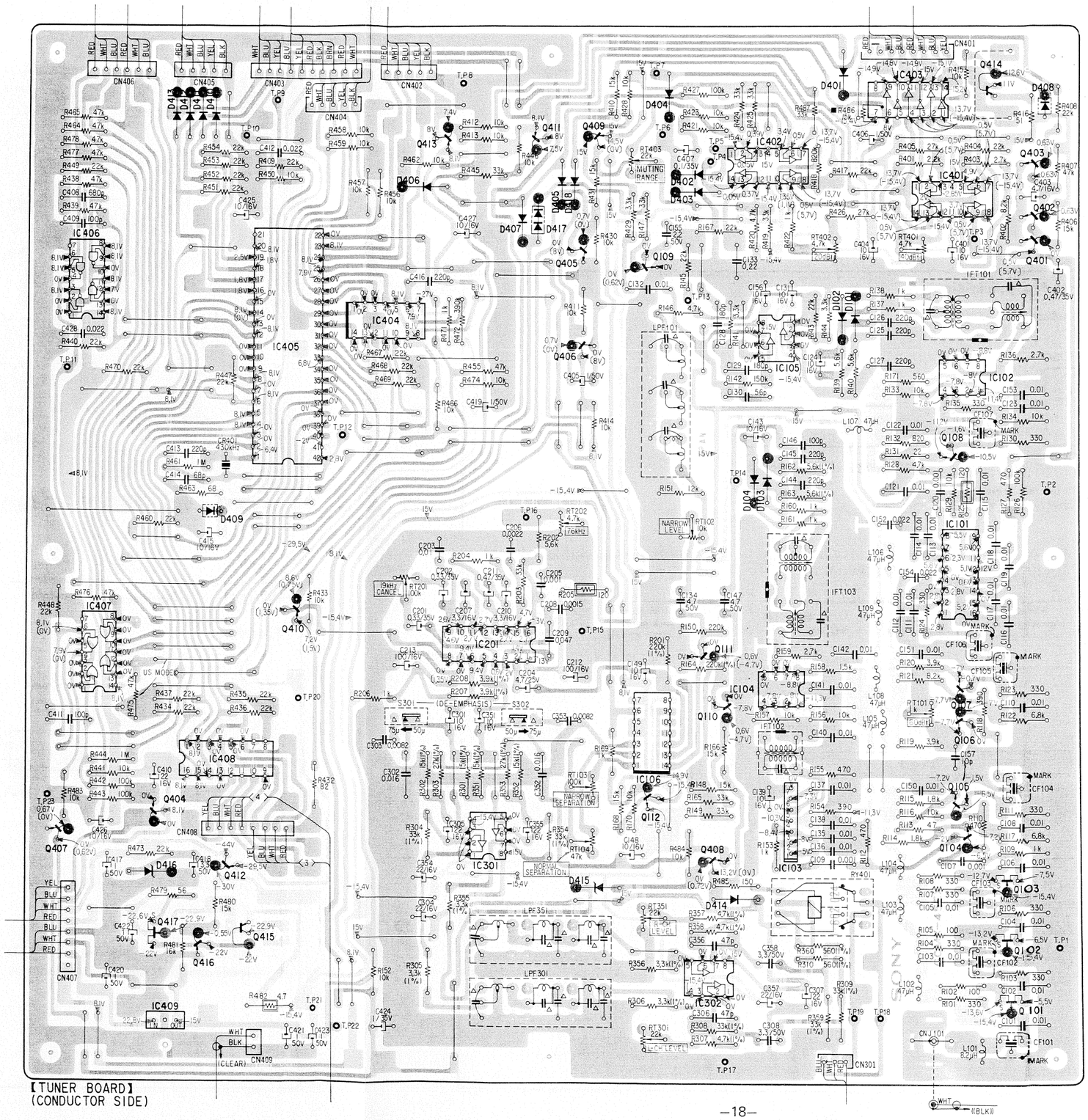
*– Conductor Side –*

| IC , Q | D |
|---|---|
| | 401 |
| 414 | 404 408 |
| IC403 | 410-413 |
| 413 411 409 | |
| IC402 | 402 |
| 403 | 405,418 |
| 406 | 403 |
| IC401 | 407,417 |
| 402 | |
| 401 | |
| 405 | |
| 109 | |
| IC406 | |
| | 102,101 |
| IC404 | |
| IC105 | |
| IC405 | |
| 406 | |
| IC102 | |
| 108 | 104,103 |
| | 409 |
| IC101 | |
| 410 | |
| IC201 | |
| IC407 111 | |
| 107 | |
| IC104 | |
| 110 | |
| 106 | |
| IC106 | |
| IC408 | |
| 112 | 105 |
| 404 | IC103 |
| 407 | 104 |
| IC301 | |
| 408 | |
| 412 | 416 |
| | 415 414 |
| 103 | |
| 417,415 | 102 |
| 416 | |
| IC302 | |
| 101 | |
| IC409 | |
| IC , Q | D |

Note:

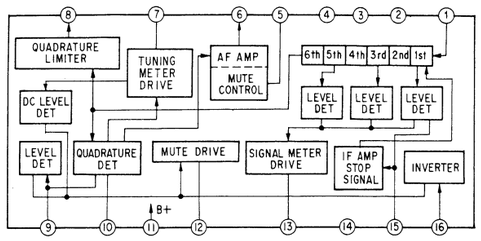
- Color code of sleeving over the end of the jacket.

- ○— : parts extracted from the component side.
- ■ : part mounted on the conductor side.
- [ ]→ : indicates side identified with part number.
- Readings are taken with a VOM (20kΩ/V).
  no mark: Detuned condition
  (98.1MHz is indicated on the display.)
  [ ] : Tuned condition
  (Received signal: 98.1MHz, 60dBμ, stereo mode, 100% modulation)
- ▒ : B + pattern
- ▒ : B – pattern

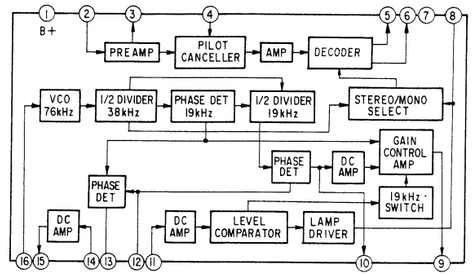



【TUNER BOARD】
(CONDUCTOR SIDE)

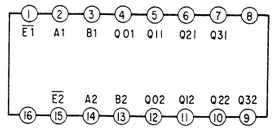
IC101 LA1231



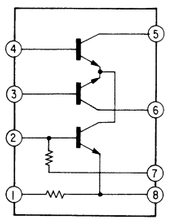

IC201 HA11223W



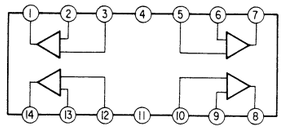

IC408 TC4555BP



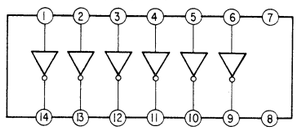

IC102,104 HA1202



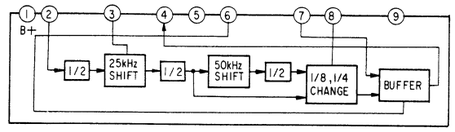
IC402 μPC324C



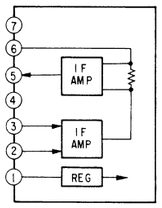
IC403,701,702 μPA67C



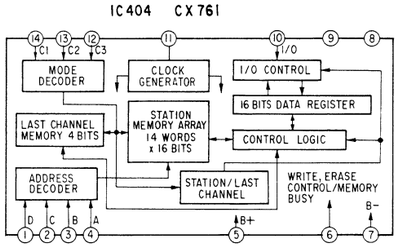
IC501 CX554



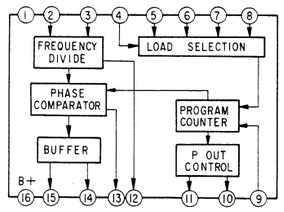

IC103 μPC577H



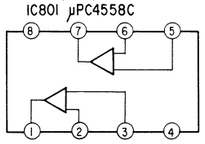

IC404 CX761



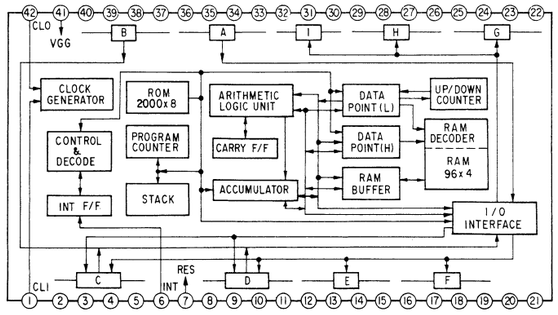

IC502 TC9125



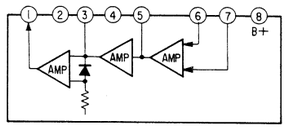

IC105,301,302 NJM4560D
IC801 μPC4558C



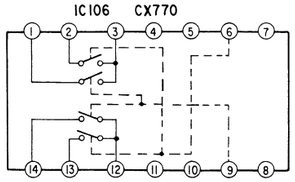
IC405 μPD553C-044



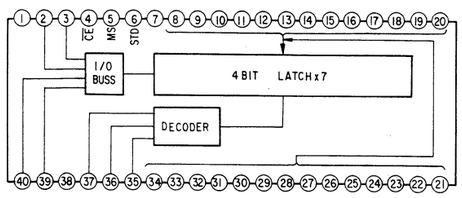

IC503 HA1457



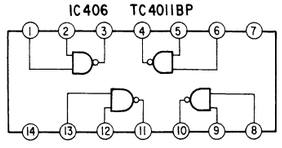

IC106 CX770



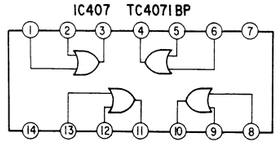
IC601 TMS1025N2L




IC406 TC4011BP



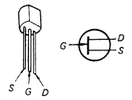
IC407 TC4071BP



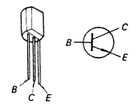
## Replacement Semiconductors

For replacement, use semiconductors except in ( ).

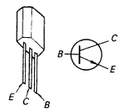
**Q101–103: 2SK125**
**Q417, 801: 2SK34**



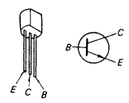

**Q104–108: 2SC710-14 (2SC710)**



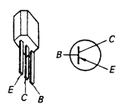

**Q109–111, Q404 : 2SC1636**



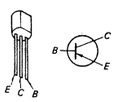

**Q112, Q401–403, Q405–408, Q803 : 2SC1364 (2SC1815)**
**Q802 : 2SC1475**



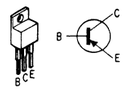

**Q409–411, Q416 : 2SA1027R (2SA1026)**



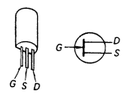

**Q412, 413: 2SA684 (2SA773)**



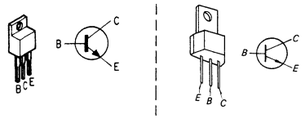

**Q414, 415, Q804 : 2SA771 (2SA769)**




**Q501: 2SK43-4 (2SK43)**




**Q805, 806: 2SC1986D-O (2SC1826)**




**IC101: LA1231**
**IC408: TC4555BP**
**IC502: TC9125P**

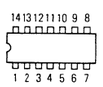


(Top view)

**IC102, 104 : HA1202**
**IC105, IC301, 302 : NJM4560D**

(Top view)

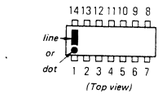
**IC103 : μPC577H**
**IC401, 402 : μPC324C**
**IC403, IC701, 702 : μPA67C**
**IC404 : CX761C (CX761)**
**IC406 : TC4011BP**
**IC407 : TC4071BP**



(Top view)

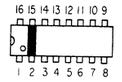


**IC106: CX770**



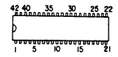
(Top view)

**IC201: HA11223W**



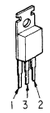
(Top view)

**IC405: μPD553C-044**



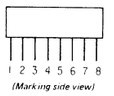
(Top view)

**IC409: μPC14315H**



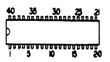

**IC501: CX554**

**IC503: HA1457**



(Marking side view)

**IC601: TMS1025N2L**

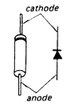


(Top view)

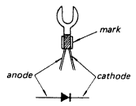
**IC801: μPC4558C**

(Top view)

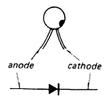
**D101–104, D401–407, D410–414, D418, D501–503 : 1S1555**
**D415 : HZ7C2L (HZ7C1L)**
**D416, 805 : HZ30-2L (HZ30-1L)**
**D804 : 10E2**



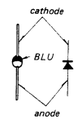

**D408: MV104V**



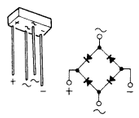

**D409: MV203V**



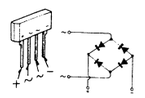

**D417: MV12N**




**D801, 803: S1RB10**



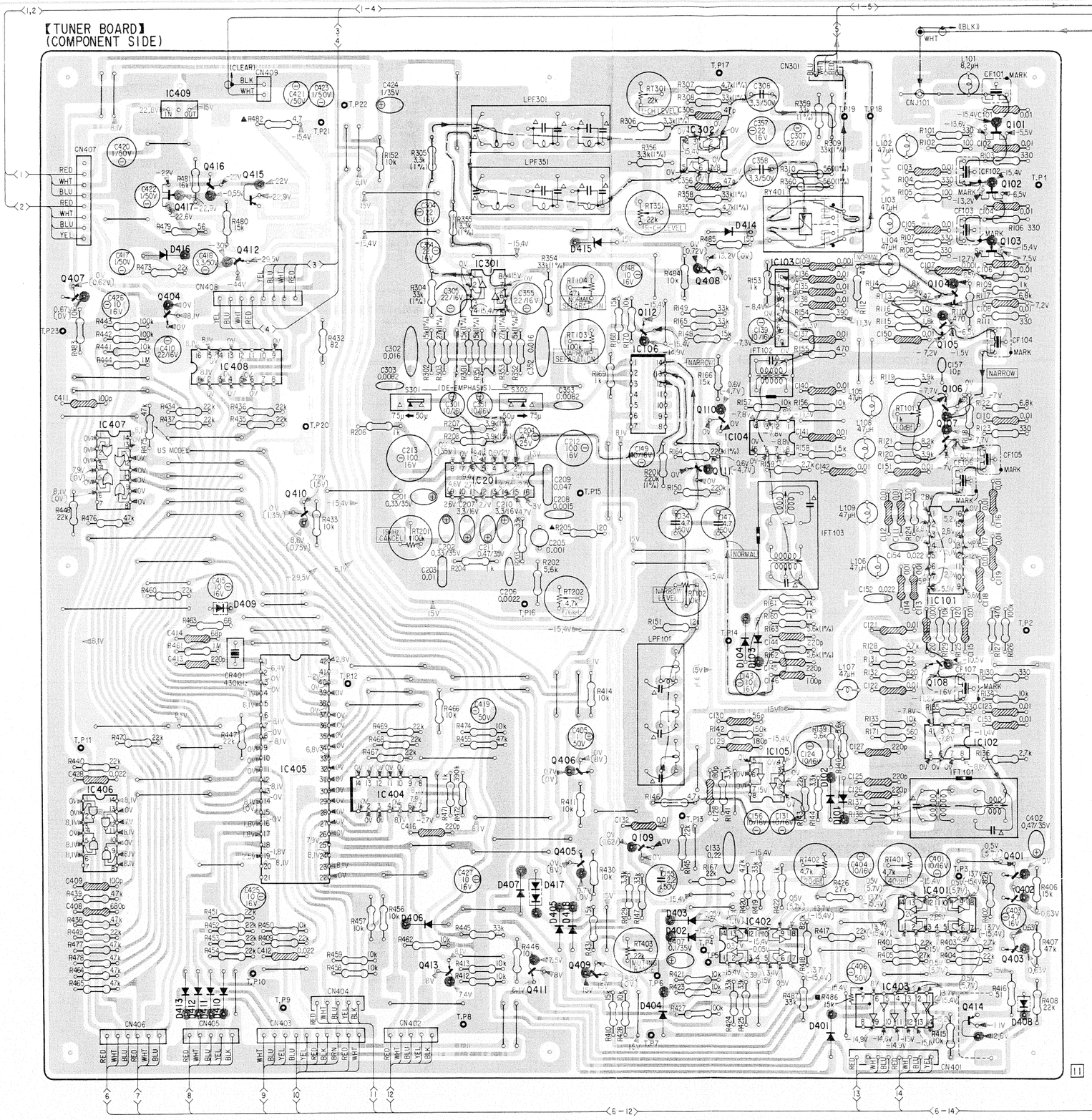

**D802: S1VB20**



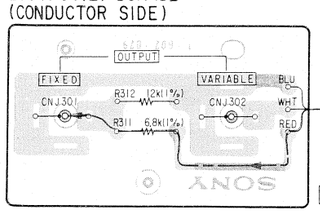
## 4-2. MOUNTING DIAGRAM

*— Component Side —*

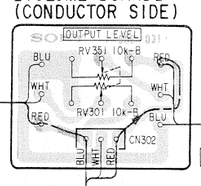
| IC , Q | D |
|---|---|
| IC409 | |
| 101 | |
| IC302 | |
| 416 | |
| 417,415 102 | |
| | 414 |
| 103 | 415 |
| 412 | 416 |
| 408 | |
| IC301 | |
| 407 104 | |
| 404 IC103 | |
| 112 105 | |
| IC408 | |
| IC106 | |
| 106 | |
| 110 | |
| IC104 107 | |
| IC407 111 | |
| IC201 | |
| 410 | |
| IC101 | |
| | 409 |
| | 104,103 |
| 108 | |
| IC102 | |
| IC405 406 | |
| IC105 | |
| IC404 | |
| | 102,101 |
| IC406 | |
| 109 | |
| 405 | |
| 401 | |
| 402 | 407,417 |
| IC401 | 406 403 |
| | 405,418 |
| 403 | 402 |
| IC402 | |
| 413 411 409 | |
| | 410-413 |
| IC403 | 404 408 |
| 414 | 401 |
| IC , Q | D |



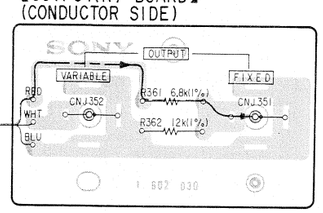
【OUTPUT(L) BOARD】
(CONDUCTOR SIDE)



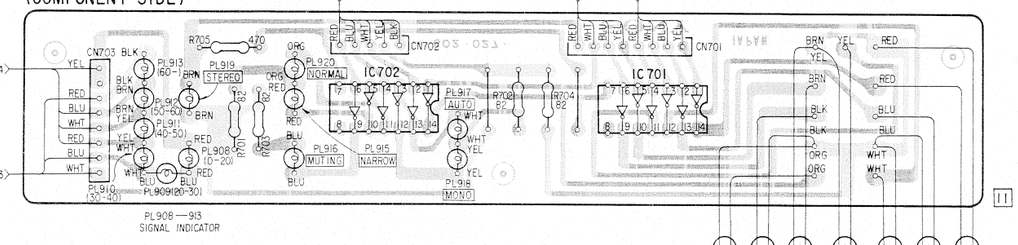

【VOLUME BOARD】
(CONDUCTOR SIDE)




【OUTPUT(R) BOARD】
(CONDUCTOR SIDE)

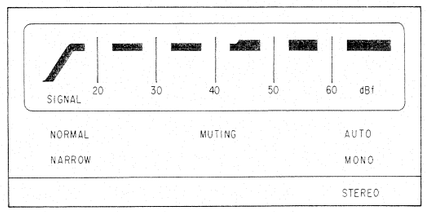



【CONNECTION BOARD】
(COMPONENT SIDE)

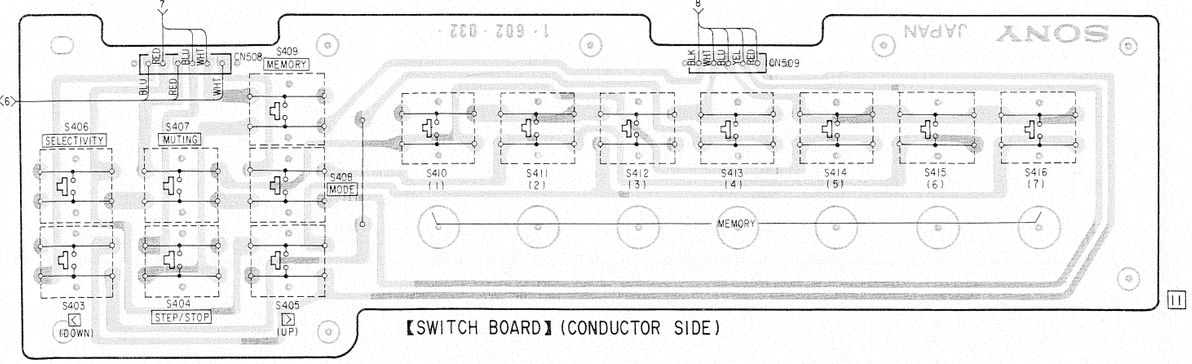



PL908—913
SIGNAL INDICATOR

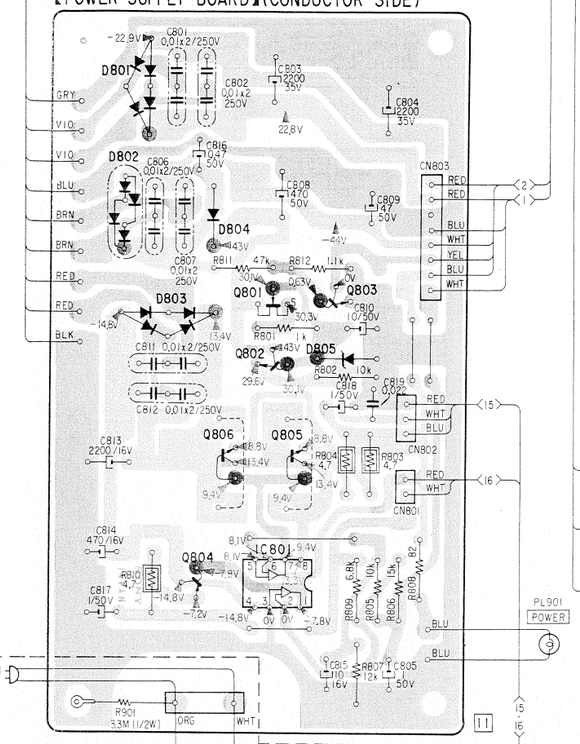
(SIGNAL INDICATOR)



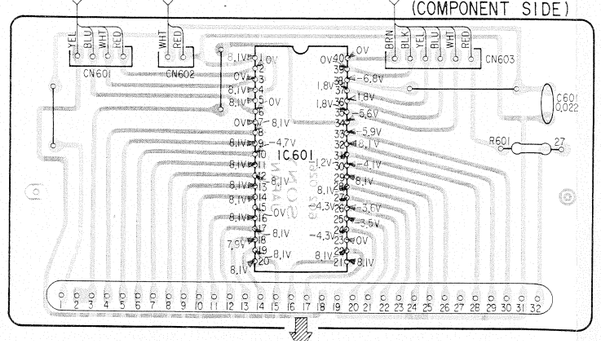

【SWITCH BOARD】(CONDUCTOR SIDE)

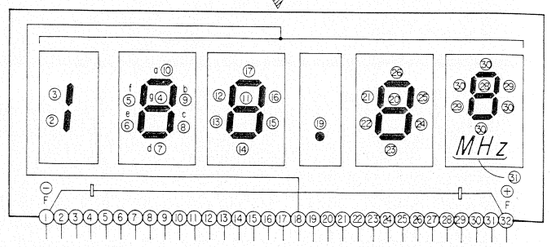



【POWER SUPPLY BOARD】(CONDUCTOR SIDE)



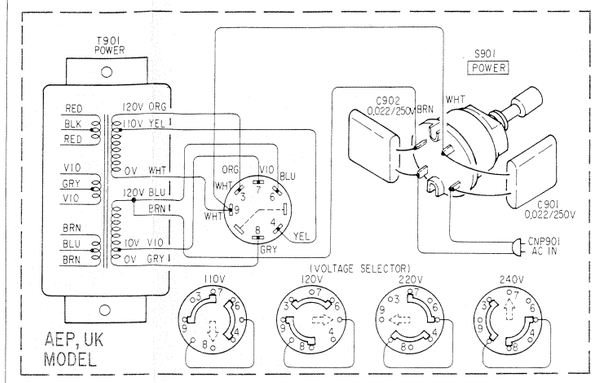

【DISPLAY BOARD】
(COMPONENT SIDE)



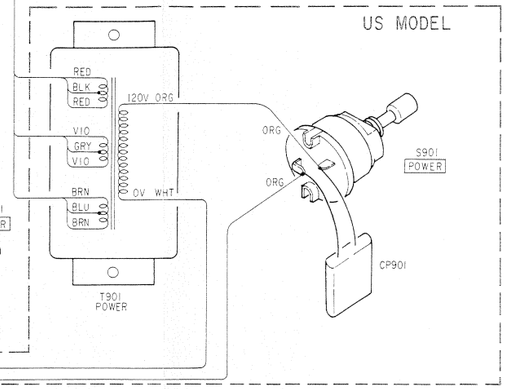




FD601
(FLUORESCENT DISPLAY TUBE)

【AEP, UK MODEL】

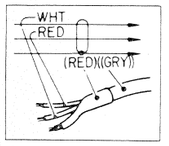



【US MODEL】




Note:

- Color code of sleeving over the end of the jacket.

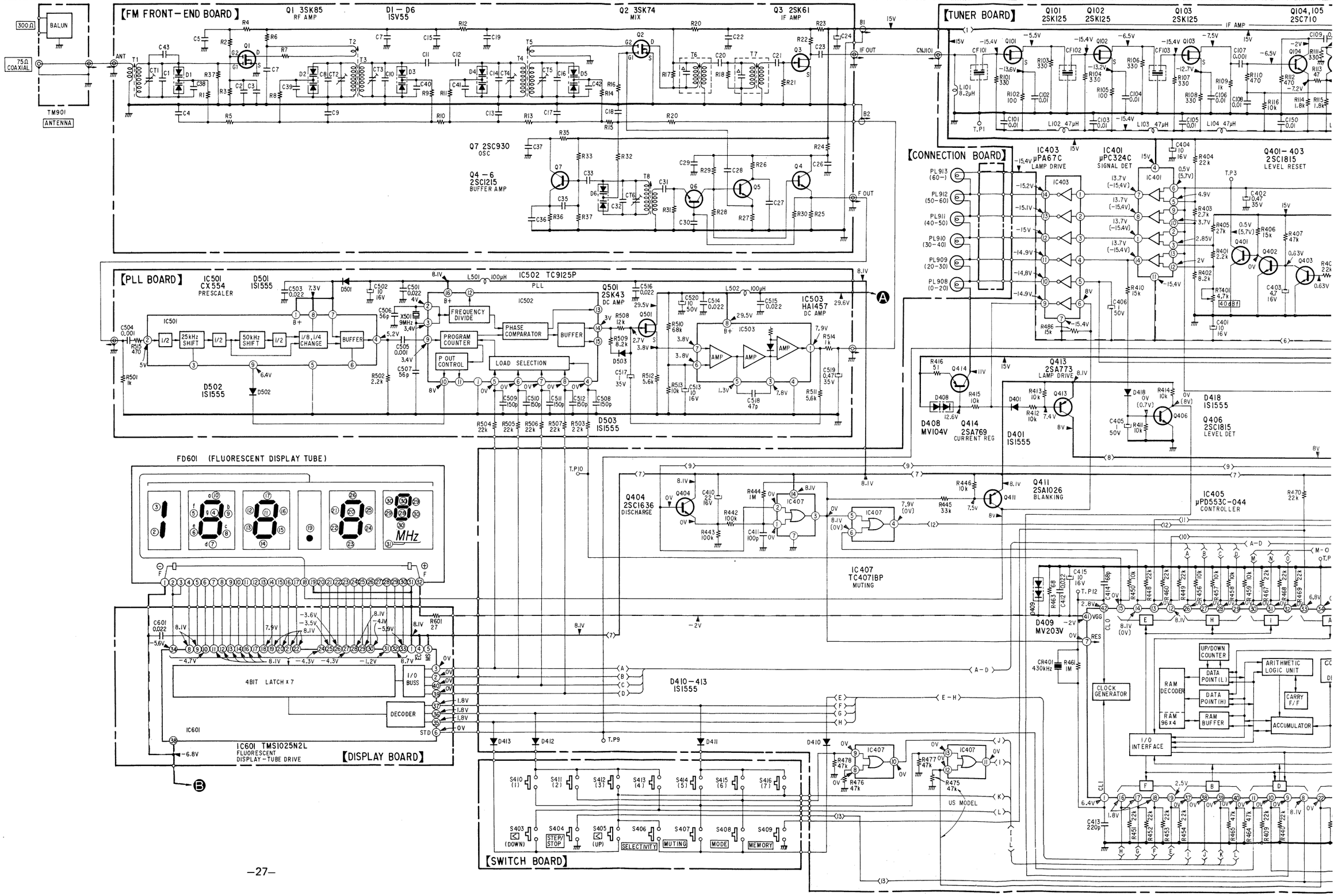



- ○—— : parts extracted from the component side.
- ■ : part mounted on the conductor side.
- [1] : indicates side identified with part number.
- ▲ : nonflammable resistor.
- Readings are taken with a VOM (20kΩ/V).
  no mark: Detuned condition
  (98.1MHz is indicated on the display.)
  [ ] : Tuned condition
  (Received signal: 98.1MHz, 60dBμ, stereo mode, 100% modulation)
- : signal path
  : L-CH signal path
  : R-CH signal path
- : B+ pattern
- : B- pattern
- : Ceramic Capacitor

## 4-3. SCHEMATIC DIAGRAM

See page 32 for the notes and pages 21, 22 for replacement semiconductors.

**ST-J88B ST-J88B**



BOARD】 Q101 2SK125 Q102 2SK125 Q103 2SK125 IF AMP Q104,105 2SC710 Q106,107 2SC710 IC101 LA1231 IF AMP Q108 2SC710 IF AMP IC102 HA1202 DISCRIMINATOR DRIVE D101,102 1S1555 IC105 NJM4560D COMPOSITE DRIVE Q109 2SC1636 MUTING

IC101 LA1231 IF AMP
1st 2nd 3rd 4th 5th 6th
LEVEL DET
IF AMP STOP SIGNAL
SIGNAL METER DRIVE
INVERTER
QUADRATURE DET
QUADRATURE LIMITER
DC LEVEL DET
AF AMP MUTE CONTROL
TUNING METER DRIVE
MUTE DRIVE

IC102 HA1202 DISCRIMINATOR DRIVE

IC105 NJM4560D COMPOSITE DRIVE

Q109 2SC1636 MUTING

D417 MV12N

IC403 μPA67C LAMP DRIVE

IC401 μPC324C SIGNAL DET

Q401-403 2SC1815 LEVEL RESET

IC103 μPC577H IF AMP

IC104 HA1202 DISCRIMINATOR DRIVE

D103,104 1S1555

Q110 2SC1636 MUTING

IC106 CX770 IF BANDWIDTH SELECTOR

Q112 2SC1815 IF BANDWIDTH SELECTOR SWITCH

NARROW SEPARATION

NORMAL SEPARATION

IC201 HA11223W MPX
PREAMP
PILOT CANCELLER
AMP
DECODER
PHASE DET
VCO 76kHz
1/2 DIVIDER 38kHz
PHASE DET 19kHz
1/2 DIVIDER 19kHz
GAIN CONTROL AMP
19kHz SWITCH
STEREO/MONO SELECT
DC AMP
PHASE DET
LAMP DRIVER
LEVEL COMPARATOR
DC AMP
DC AMP

Q413 2SA773 LAMP DRIVE

D401 1S1555

D418 1S1555

Q406 2SC1815 LEVEL DET

IC402 μPC324C NULL DET

Q409 2SA1026 NOISE DET

Q405 2SC1815 LEVEL DET

D402-407 1S1555

Q410 2SA1026 LAMP DRIVE

Q411 2SA1026 BLANKING

IC405 μPD553C-044 CONTROLLER
CLOCK GENERATOR
RAM DECODER
RAM 96x4
DATA POINT(L)
DATA POINT(H)
RAM BUFFER
UP/DOWN COUNTER
ARITHMETIC LOGIC UNIT
CARRY F/F
ACCUMULATOR
CONTROL & DECODE
INT F/F
ROM 2000x8
PROGRAM COUNTER
STACK
I/O INTERFACE

IC408 TC4555BP DECODER

【CONNECTION BOARD】

IC701 μPA67C LAMP DRIVE

IC702 μPA67C LAMP DRIVE

PL902 (1) PL903 (2) PL904 (3) PL905 (4) PL906 (5) PL907 (6) PL914 (7)

PL919 STEREO PL920 NORMAL PL915 NARROW PL917 AUTO PL918 MONO PL916 MUTING

IC406 TC4011BP MEMORY CLOCK

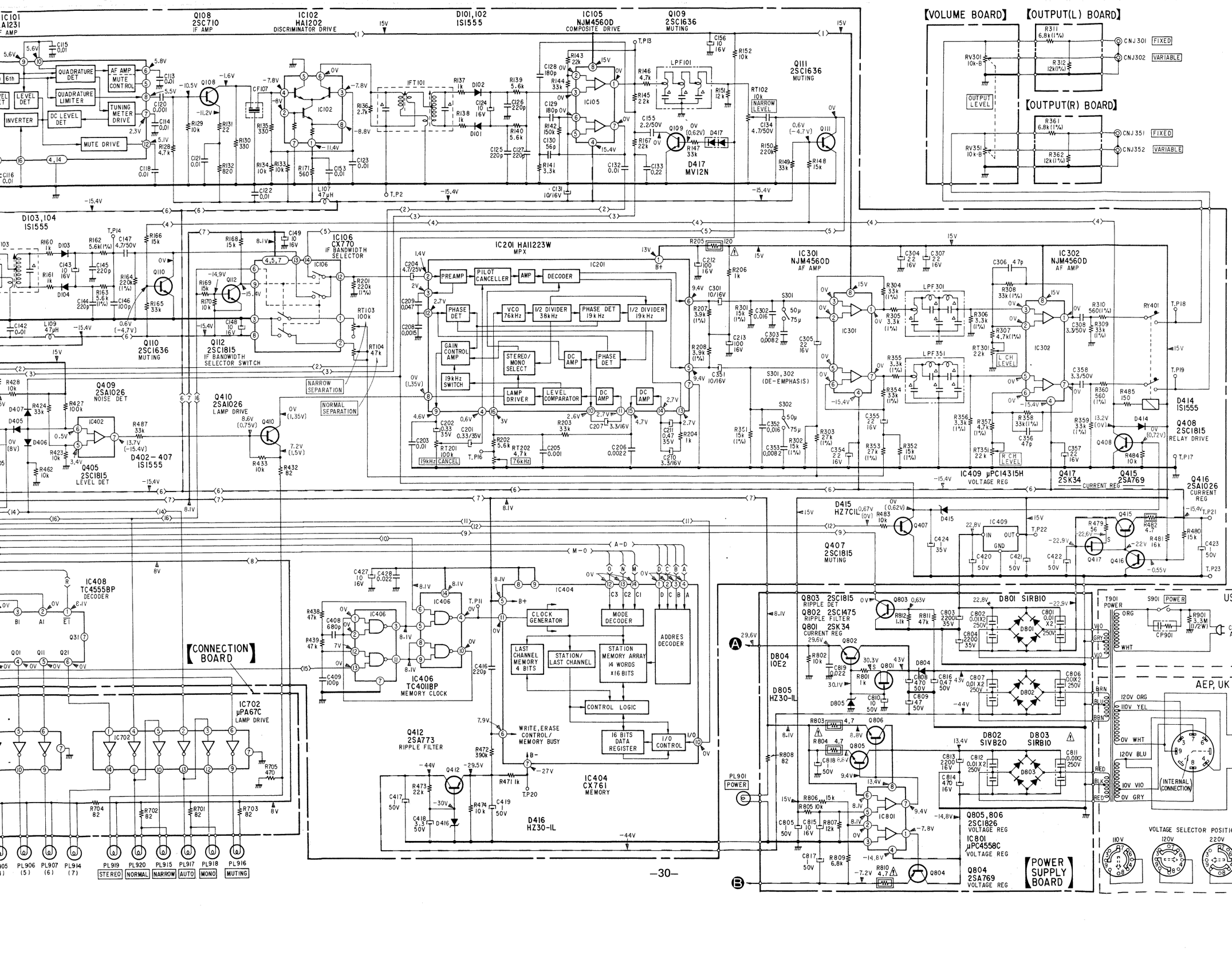
IC404 CX761 MEMORY
CLOCK GENERATOR
MODE DECODER
ADDRES DECODER
LAST CHANNEL MEMORY 4 BITS
STATION/LAST CHANNEL
STATION MEMORY ARRAY 14 WORDS x16 BITS
CONTROL LOGIC
16 BITS DATA REGISTER
I/O CONTROL
WRITE, ERASE CONTROL/MEMORY BUSY

Q412 2SA773 RIPPLE FILTER

D416 HZ30-IL

PL901 POWER

ST-J88B


IC101 A1231 IF AMP
Q108 2SC710 IF AMP
IC102 HA1202 DISCRIMINATOR DRIVE
D101, 102 1S1555
IC105 NJM4560D COMPOSITE DRIVE
Q109 2SC1636 MUTING
Q111 2SC1636 MUTING
【VOLUME BOARD】
【OUTPUT(L) BOARD】
【OUTPUT(R) BOARD】
CNJ301 FIXED
CNJ302 VARIABLE
CNJ351 FIXED
CNJ352 VARIABLE
D417 MV12N
D103, 104 1S1555
IC106 CX770 IF BANDWIDTH SELECTOR
Q110 2SC1636 MUTING
Q112 2SC1815 IF BANDWIDTH SELECTOR SWITCH
NARROW SEPARATION
NORMAL SEPARATION
IC201 HA11223W MPX
PREAMP
PILOT CANCELLER
AMP
DECODER
PHASE DET
VCO 76kHz
1/2 DIVIDER 38kHz
PHASE DET 19kHz
1/2 DIVIDER 19kHz
GAIN CONTROL AMP
STEREO/ MONO SELECT
DC AMP
PHASE DET
19kHz SWITCH
LAMP DRIVER
LEVEL COMPARATOR
DC AMP
DC AMP
IC301 NJM4560D AF AMP
IC302 NJM4560D AF AMP
S301, 302 (DE-EMPHASIS)
LPF301
LPF351
L CH LEVEL
R CH LEVEL
RY401
D414 1S1555
Q408 2SC1815 RELAY DRIVE
Q409 2SA1026 NOISE DET
Q410 2SA1026 LAMP DRIVE
D402-407 1S1555
Q405 2SC1815 LEVEL DET
IC402
IC409 μPC14315H VOLTAGE REG
Q417 2SK34 CURRENT REG
Q415 2SA769
Q416 2SA1026 CURRENT REG
D415 HZ7C1L
Q407 2SC1815 MUTING
IC409
IC408 TC4555BP DECODER
IC406 TC40118P MEMORY CLOCK
IC404 CX761 MEMORY
CLOCK GENERATOR
MODE DECODER
ADDRES DECODER
LAST CHANNEL MEMORY 4 BITS
STATION/ LAST CHANNEL
STATION MEMORY ARRAY 14 WORDS x16 BITS
CONTROL LOGIC
16 BITS DATA REGISTER
I/O CONTROL
WRITE, ERASE CONTROL/ MEMORY BUSY
【CONNECTION BOARD】
IC702 μPA67C LAMP DRIVE
Q412 2SA773 RIPPLE FILTER
D416 HZ30-IL
Q803 2SC1815 RIPPLE DET
Q802 2SC1475 RIPPLE FILTER
Q801 2SK34 CURRENT REG
D804 10E2
D805 HZ30-IL
D801 SIRB10
D802 SIVB20
D803 SIRB10
Q805,806 2SC1826 VOLTAGE REG
IC801 μPC4558C VOLTAGE REG
Q804 2SA769 VOLTAGE REG
【POWER SUPPLY BOARD】
US MODEL
AEP, UK MODEL
VOLTAGE SELECTOR POSITION
110V
120V
220V
240V
PL901 POWER
PL919 STEREO
PL920 NORMAL
PL915 NARROW
PL917 AUTO
PL918 MONO
PL916 MUTING

**Note:**

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ⚠ : nonflammable resistor.
- △ : internal component.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ——— : B+ bus.
- – – – : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Voltage variations may be noted due to normal production tolerances.
- Readings are taken with a VOM (20kΩ/V).
  no mark: Detuned condition
  (98.1MHz is indicated on the display.)
  [ ] : Tuned condition
  (Received signal: 98.1MHz, 60dBμ, stereo mode, 100% modulation)

- Switch

| Ref. No. | Switch | Position |
|---|---|---|
| S301, 351 | DE-EMPHASIS | 50μS |
| S403 | < (count down) | OFF |
| S404 | STEP/STOP | OFF |
| S405 | > (count up) | OFF |
| S406 | SELECTIVITY | NORMAL |
| S407 | MUTING | ON |
| S408 | MODE | AUTO |
| S409 | MEMORY | OFF |
| S410 | PRESET 1 | OFF |
| S411 | PRESET 2 | OFF |
| S412 | PRESET 3 | OFF |
| S413 | PRESET 4 | OFF |
| S414 | PRESET 5 | OFF |
| S415 | PRESET 6 | OFF |
| S416 | PRESET 7 | OFF |
| S901 | POWER | OFF |

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**





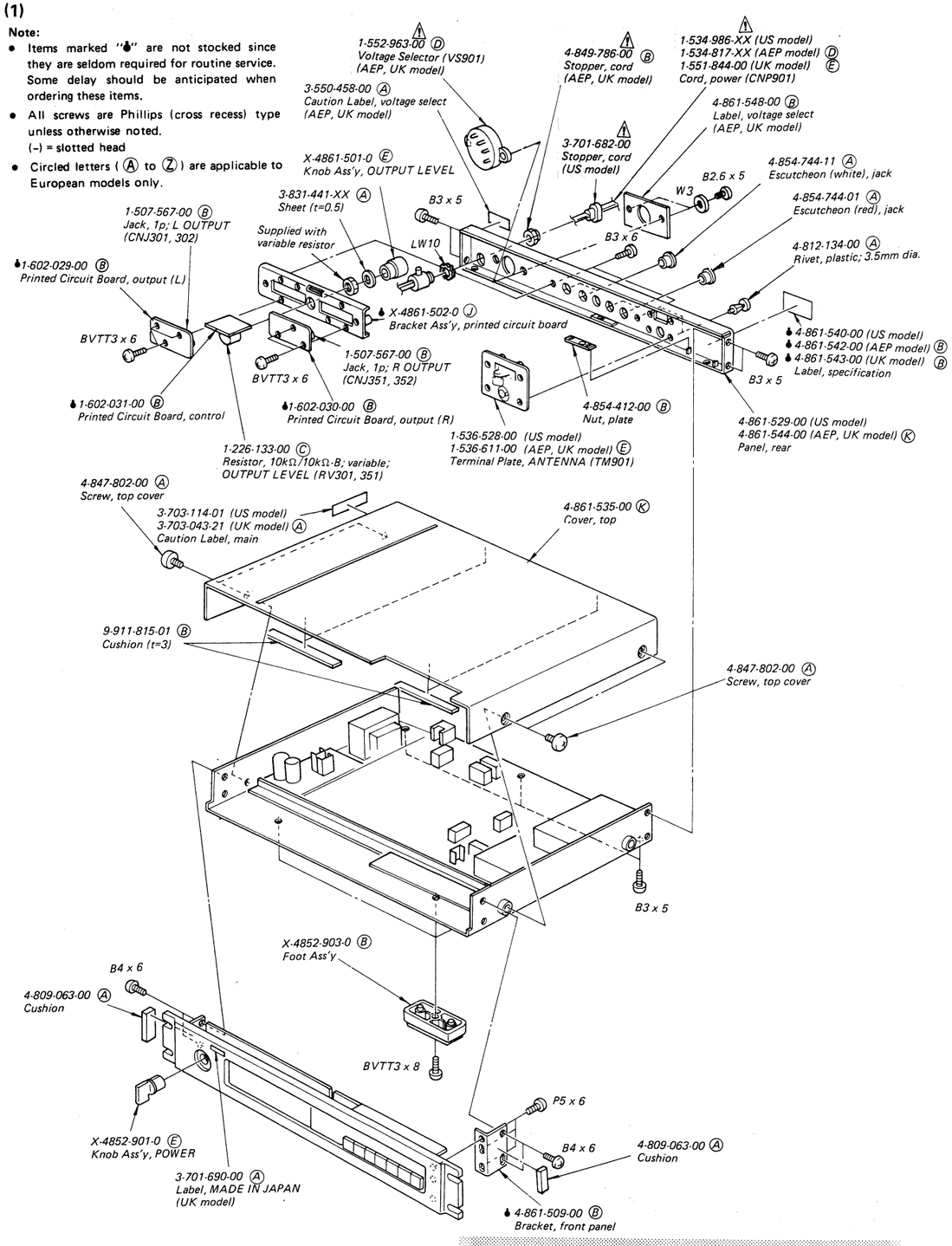
ST-J88B

ST-J88B

## (1)

**Note:**

- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.



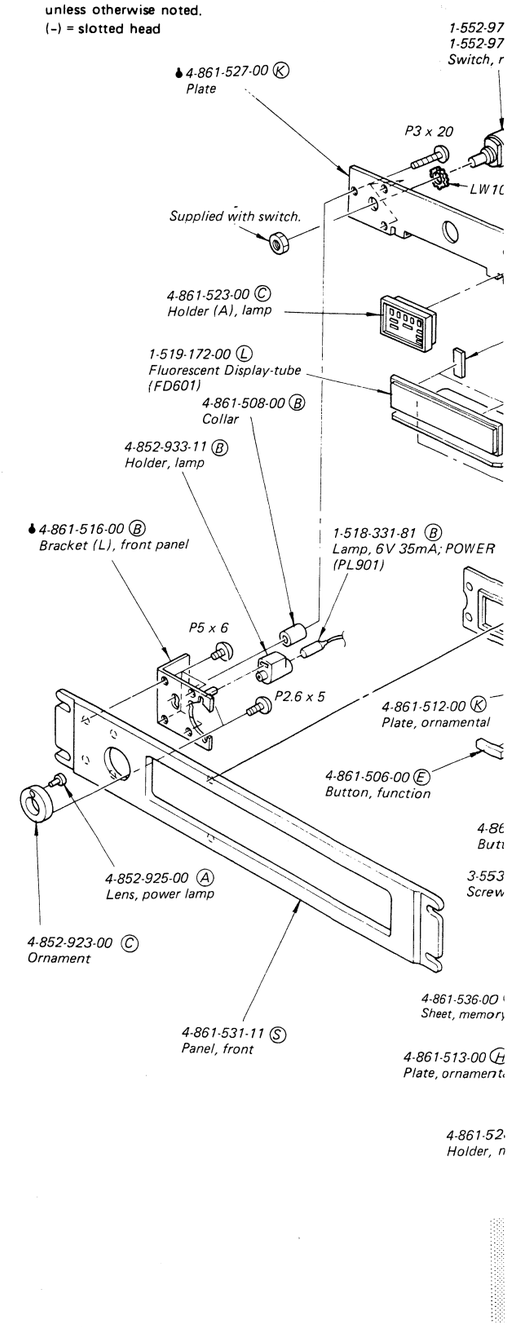

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

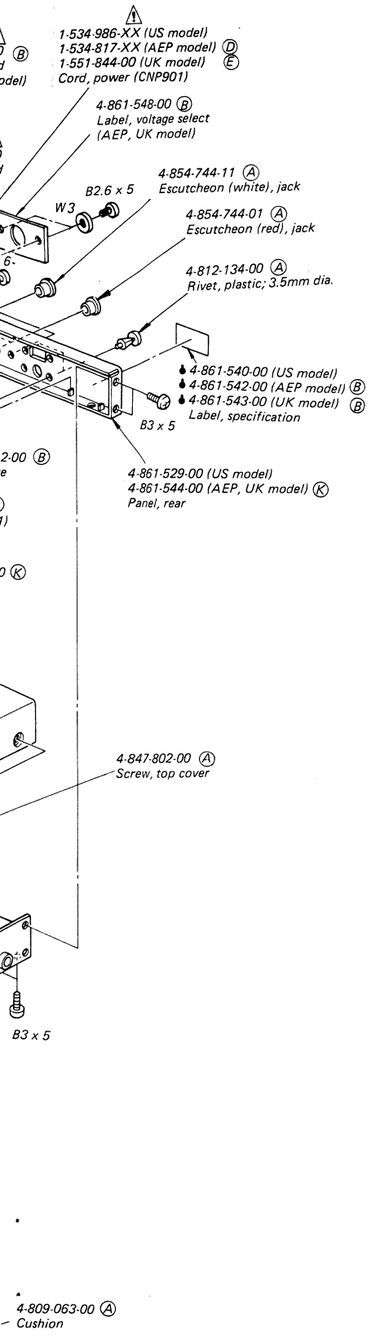


## (2)

**Note:**

- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters ( European model



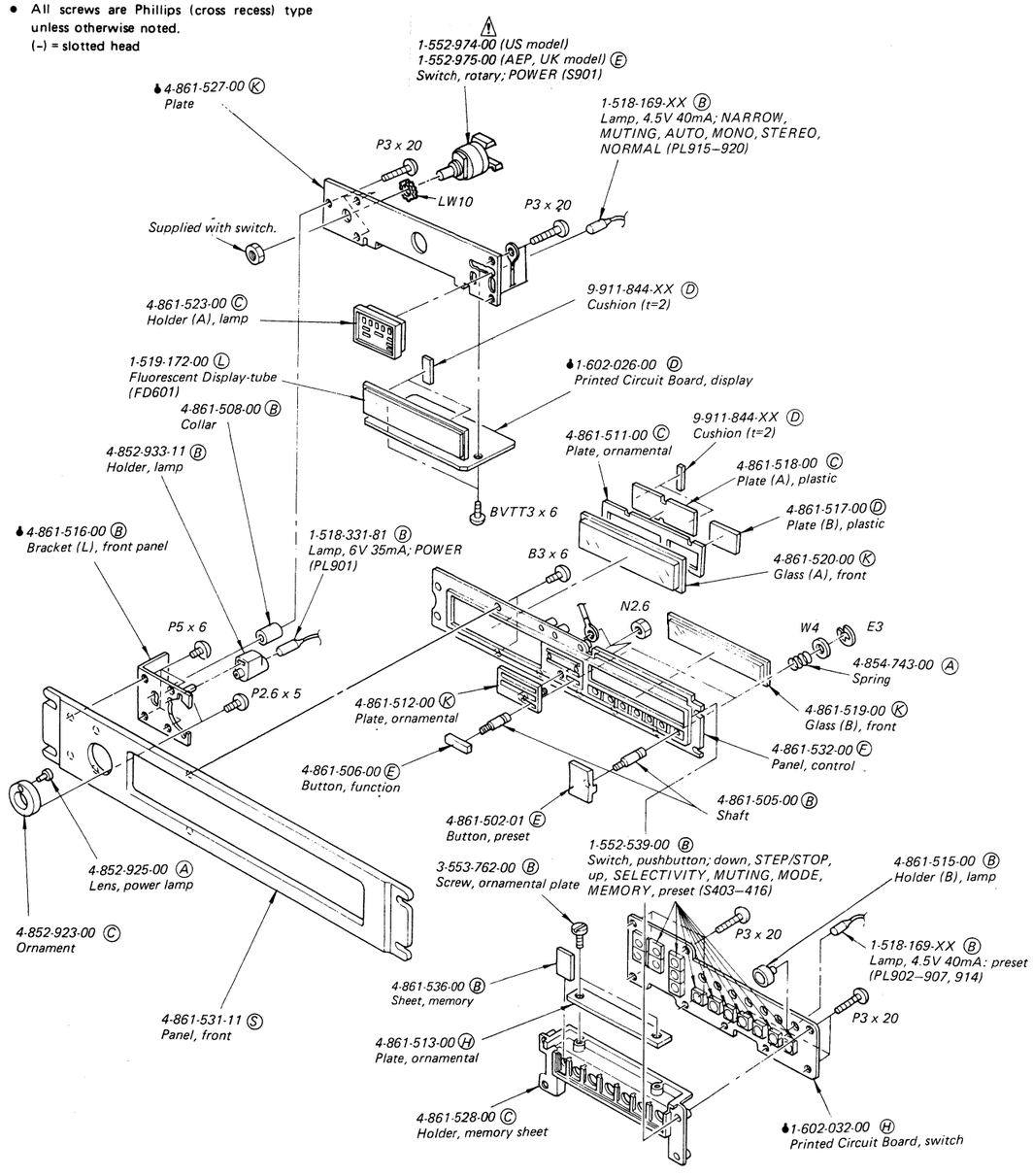



**nts identified by shading and mark al for safety. Replace only with specified.**

**(2)**

**Note:**

- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.



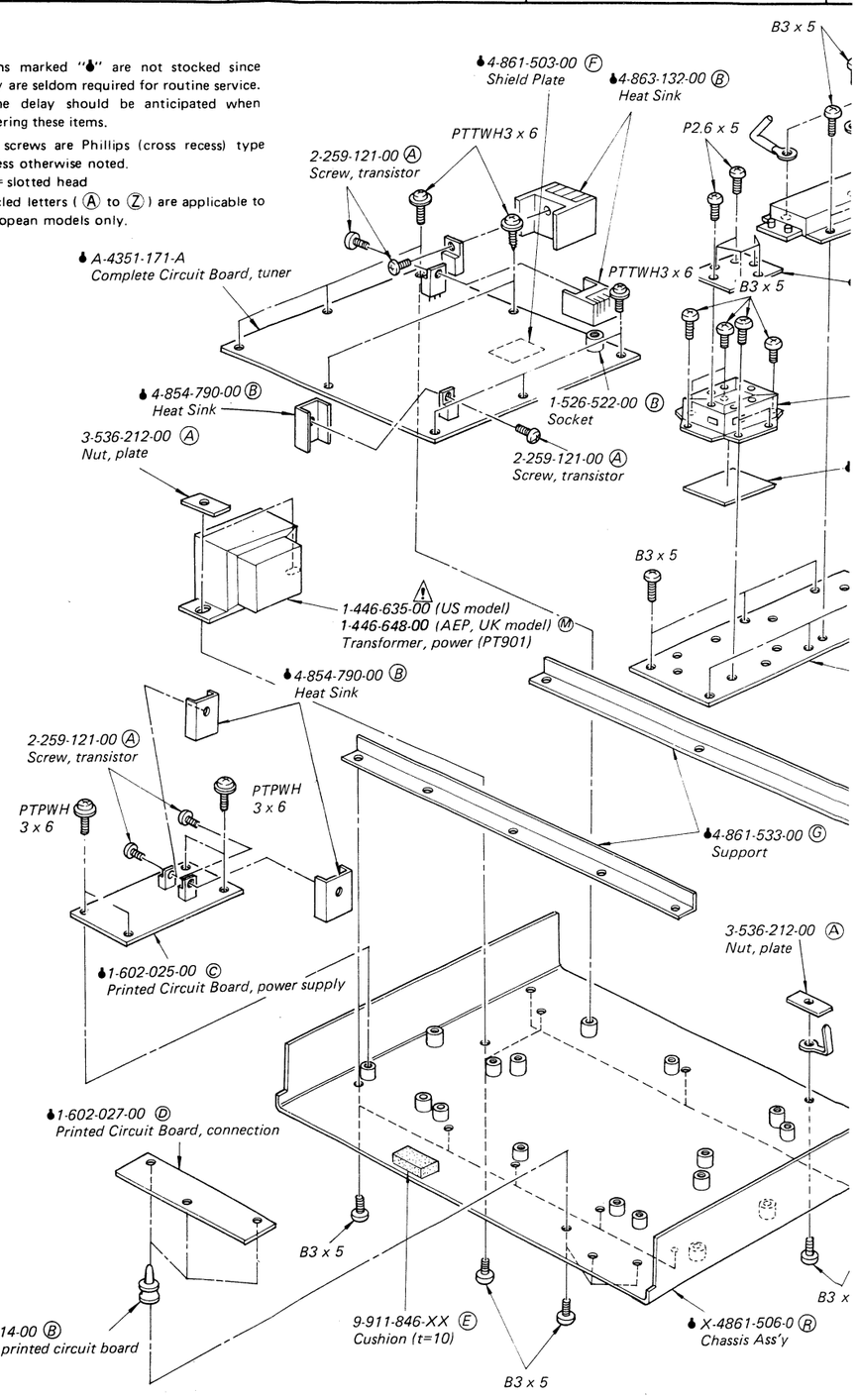

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**



**(3)**

**Note:**

- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

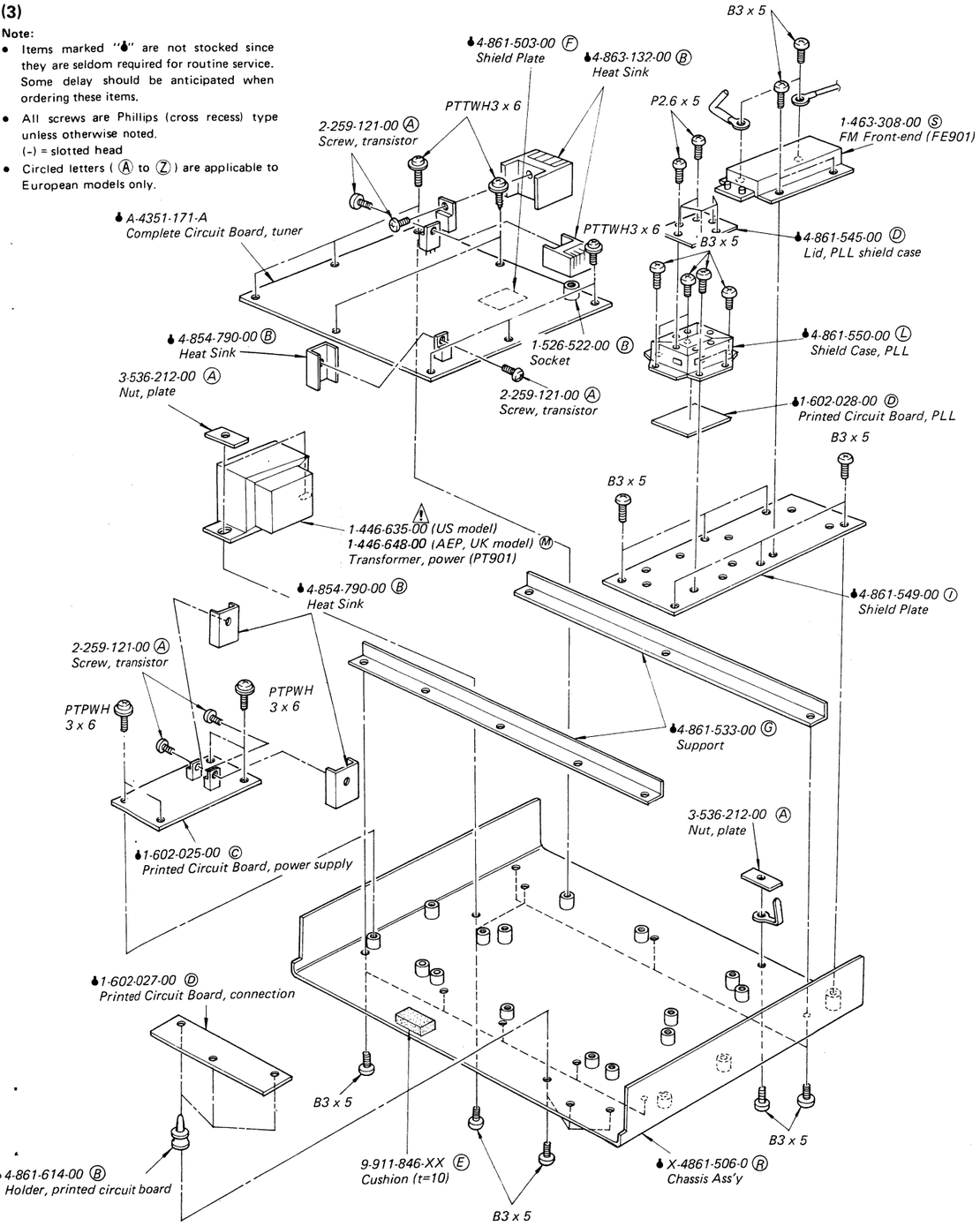



**Note: The components identified by sha ⚠ are critical for safety. Repl part number specified.**

A | B | C | D

(3)

**Note:**
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.




**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**



# SECTION 6
# ELECTRICAL PARTS LIST

**Note:** Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

| Ref. No. | Part No. | Description |
|---|---|---|
| | | **SEMICONDUCTORS** |
| | | **Transistors** |
| Q101–103 | 8-765-450-20 | Ⓓ 2SK125 |
| ⇒ Q104–108 | 8-729-671-14 | Ⓑ 2SC710-14 |
| Q109–111 | 8-761-622-00 | Ⓑ 2SC1636 |
| ⇒ Q112<br>⇒ Q401–403 | 8-729-663-47 | Ⓒ 2SC1364 |
| Q404 | 8-761-622-00 | Ⓑ 2SC1636 |
| ⇒ Q405–408 | 8-729-663-47 | Ⓒ 2SC1364 |
| ⇒ Q409–411 | 8-729-612-77 | Ⓑ 2SA1027R |
| ⇒ Q412, 413 | 8-729-468-43 | Ⓒ 2SA684 |
| ⇒ Q414, 415 | 8-729-377-12 | Ⓔ 2SA771 |
| ⇒ Q416 | 8-729-612-77 | Ⓑ 2SA1027R |
| Q417 | 8-729-634-03 | Ⓑ 2SK34 |
| ⇒ Q501 | 8-723-304-00 | Ⓔ 2SK43-4 |
| Q801 | 8-729-634-03 | Ⓑ 2SK34 |
| Q802 | 8-760-413-10 | Ⓑ 2SC1475 |
| ⇒ Q803 | 8-729-663-47 | Ⓒ 2SC1364 |
| ⇒ Q804 | 8-729-377-12 | Ⓔ 2SA771 |
| ⇒ Q805, 806 | 8-729-308-72 | Ⓓ 2SC1986D-O |
| | | **ICs** |
| IC101 | 8-759-812-31 | Ⓕ LA1231 |
| IC102 | 8-759-312-02 | Ⓒ HA1202 |
| IC103 | 8-759-157-70 | Ⓔ μPC577H |
| IC104 | 8-759-312-02 | Ⓒ HA1202 |
| IC105 | 8-759-745-60 | Ⓓ NJM4560D |
| IC106 | 8-757-700-00 | Ⓖ CX770 |
| IC201 | 8-759-312-23 | Ⓗ HA11223W |
| IC301, 302 | 8-759-745-60 | Ⓓ NJM4560D |
| IC401, 402 | 8-759-132-40 | Ⓖ μPC324C |
| IC403 | 8-759-100-67 | Ⓔ μPA67C |
| ⇒ IC404 | 8-757-611-00 | Ⓚ CX761A |
| IC405 | 8-759-154-44 | Ⓝ μPD553C-044 |
| IC406 | 8-759-240-11 | Ⓑ TC4011BP |
| IC407 | 8-759-240-71 | Ⓓ TC4071BP |
| IC408 | 8-759-245-55 | Ⓕ TC4555BP |
| IC409 | 8-759-143-15 | Ⓕ PC14315H |
| IC501 | 8-759-205-54 | Ⓚ CX554 |
| IC502 | 8-759-291-25 | Ⓚ TC9125P |
| IC503 | 8-759-314-57 | Ⓒ HA1457 |
| IC601 | 8-759-990-25 | Ⓗ TMS1025N2L |
| IC701, 702 | 8-759-100-67 | Ⓔ μPA67C |
| IC801 | 8-759-145-58 | Ⓓ μPC4558C |
| | | **Diodes** |
| D101–104 | 8-719-815-55 | Ⓑ 1S1555 |
| D401–407 | 8-719-815-55 | Ⓑ 1S1555 |
| D408 | 8-719-910-40 | Ⓑ MV104V |
| D409 | 8-719-920-30 | Ⓑ MV203V |
| D410–414 | 8-719-815-55 | Ⓑ 1S1555 |
| ⇒ D415 | 8-719-910-78 | Ⓑ HZ7C2L |
| ⇒ D416 | 8-719-913-02 | Ⓑ HZ30-2L |
| D417 | 8-719-912-00 | Ⓑ MV12N |
| D418 | 8-719-815-55 | Ⓑ 1S1555 |
| D501–503 | 8-719-815-55 | Ⓑ 1S1555 |
| D801 | ⚠ 8-719-510-10 | Ⓒ S1RB10 |
| D802 | ⚠ 8-719-511-20 | Ⓒ S1VB20 |
| D803 | ⚠ 8-719-510-10 | Ⓒ S1RB10 |
| D804 | ⚠ 8-719-200-02 | Ⓑ 10E2 |
| ⇒ D805 | 8-719-913-02 | Ⓑ HZ30-2L |
| | | **COILS** |
| L101 | 1-407-189-XX | Ⓑ 8.2μH, microinductor |
| L102–109 | 1-407-165-XX | Ⓑ 47μH, microinductor |
| L501, 502 | 1-407-169-XX | Ⓐ 100μH, microinductor |
| | | **TRANSFORMERS** |
| IFT101 | 1-404-250-00 | Ⓓ Discriminator |
| IFT102 | 1-403-899-00 | Ⓑ IFT |

⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

**Note:** Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

| *Ref. No.* | *Part No.* | *Description* | | |
|---|---|---|---|---|
| IFT103 | 1-404-250-00 | Ⓓ Discriminator | | |
| PT901 | ⚠ 1-446-635-00 | Power (US model) | | |
| | ⚠ 1-446-648-00 | Ⓜ Power (AEP, UK model) | | |

### CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics and tantalums. p : μμF, elect : electrolytic
Common capacitors are omitted. Refer to the lists on pages 40 and 41 for their part numbers.

| | | | | | |
|---|---|---|---|---|---|
| C107, 109, C120 | 1-161-323-00 | Ⓐ 0.001 | | | |
| C124 | 1-121-651-00 | Ⓑ 10 | 16V | elect | |
| C125–127 | 1-161-315-00 | Ⓐ 220p | | | |
| C128, 129 | 1-161-314-00 | Ⓐ 180p | | | |
| C134 | 1-123-232-00 | Ⓑ 4.7 | 50V | elect | (nonpolarized) |
| C143 | 1-121-651-00 | Ⓑ 10 | 16V | elect | |
| C144, 145 | 1-161-315-00 | Ⓐ 220p | | | |
| C147 | 1-123-232-00 | Ⓑ 4.7 | 50V | elect | (nonpolarized) |
| C155 | 1-123-230-00 | Ⓑ 2.2 | 50V | elect | (nonpolarized) |
| C213 | 1-123-320-00 | Ⓑ 100 | 16V | elect | |
| C301, 351 | 1-121-651-00 | Ⓑ 10 | 16V | elect | |
| C302, 352 | 1-130-125-00 | Ⓑ 0.016 | 100V | polyethylene | |
| C308, 358 | 1-123-231-00 | Ⓑ 3.3 | 50V | elect | (nonpolarized) |
| C413–416 | 1-161-315-00 | Ⓐ 220p | | | |
| C506, 507 | 1-101-884-00 | Ⓐ 56p | | | |
| C801, 802 | ⚠ 1-102-394-00 | Ⓑ 0.01/0.01 | 250V | (dual type) | |
| C803, 804 | ⚠ 1-123-509-00 | Ⓒ 2200 | 35V | elect | |
| C806, 807 | ⚠ 1-102-394-00 | Ⓑ 0.01/0.01 | 250V | (dual type) | |
| C808 | ⚠ 1-123-516-00 | Ⓒ 470 | 50V | elect | |
| C809 | ⚠ 1-123-512-00 | Ⓑ 47 | 50V | elect | |
| C811, 812 | ⚠ 1-102-394-00 | Ⓑ 0.01/0.01 | 250V | (dual type) | |
| C813 | ⚠ 1-123-489-00 | Ⓒ 2200 | 16V | elect | |
| C814 | ⚠ 1-123-487-00 | Ⓑ 470 | 16V | elect | |

| *Ref. No.* | *Part No.* | *Description* | | | |
|---|---|---|---|---|---|
| C816 | ⚠ 1-121-726-00 | Ⓑ 0.47 | 50V | elect | |
| C901, 902 | ⚠ 1-130-267-00 | Ⓒ 0.022 (AEP, UK model) | 250V | film | |

### RESISTORS

All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on last page for their part numbers.

| | | | | | |
|---|---|---|---|---|---|
| R125 | ⚠ 1-247-109-00 | Ⓐ 120 | ¼W | carbon | (nonflammable) |
| R162, 163 | 1-214-747-00 | Ⓐ 5.6k | ¼W | metal oxide | (1%) |
| R164, 201 | 1-214-785-00 | Ⓐ 220k | ¼W | metal oxide | (1%) |
| R205 | ⚠ 1-247-109-00 | Ⓐ 120 | ¼W | carbon | (nonflammable) |
| R207, 208 | 1-214-743-00 | Ⓐ 3.9k | ¼W | metal oxide | (1%) |
| R301, 351, R302, 352 | 1-214-757-00 | Ⓐ 15k | ¼W | metal oxide | (1%) |
| R304, 354 | 1-214-765-00 | Ⓐ 33k | ¼W | metal oxide | (1%) |
| R305, 355, R306, 356 | 1-214-741-00 | Ⓐ 3.3k | ¼W | metal oxide | (1%) |
| R308, 358, R309, 359 | 1-214-765-00 | Ⓐ 33k | ¼W | metal oxide | (1%) |
| R310, 360 | 1-214-723-00 | Ⓐ 560 | ¼W | metal oxide | (1%) |
| R311, 361 | 1-214-749-00 | Ⓐ 6.8k | ¼W | metal oxide | (1%) |
| R312, 362 | 1-214-755-00 | Ⓐ 12k | ¼W | metal oxide | (1%) |
| R482 | ⚠ 1-247-079-00 | Ⓐ 4.7 | ¼W | carbon | (nonflammable) |
| R803, 804 | ⚠ 1-247-079-00 | Ⓐ 4.7 | ¼W | carbon | (nonflammable) |
| R810 | ⚠ 1-247-079-00 | Ⓐ 4.7 | ¼W | carbon | (nonflammable) |
| R901 | ⚠ 1-202-725-00 | 3.3M (US model) | ½W | composition | |
| RT101 | 1-224-550-21 | Ⓑ 220-B, adjustable; 60dBf | | | |
| RT102 | 1-224-252-XX | Ⓑ 10k-B, adjustable; narrow level | | | |
| RT103 | 1-224-255-XX | Ⓑ 100k-B, adjustable; narrow separation | | | |
| RT104 | 1-224-254-XX | Ⓑ 47k-B, adjustable; normal separation | | | |
| RT201 | 1-224-255-XX | Ⓑ 100k-B, adjustable; 19kHz cancel | | | |

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**



**Note:** Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

| *Ref. No.* | *Part No.* | *Description* | | | |
|---|---|---|---|---|---|
| RT202 | 1-224-251-XX | Ⓑ 4.7k-B, adjustable; 76kHz | | | |
| RT301, 351 | 1-224-253-XX | Ⓑ 22k-B, adjustable; level | | | |
| RT401, 402 | 1-224-251-XX | Ⓑ 4.7k-B, adjustable; 40dBf, 20dBf | | | |
| RT403 | 1-224-253-XX | Ⓑ 22k-B, adjustable; muting range | | | |
| RV301, 351 | 1-226-133-00 | Ⓓ 10k/10k-B, variable; OUTPUT LEVEL | | | |

### SWITCHES

| | | | | | |
|---|---|---|---|---|---|
| S301, 351 | 1-552-430-00 | Ⓑ Slide, de-emphasis | | | |
| S403–416 | 1-552-539-00 | Ⓑ Pushbutton, down, STEP/STOP, up, SELECTIVITY, MUTING MODE, MEMORY, preset | | | |
| S901 | ⚠ 1-552-974-00 | Rotary, POWER (US model) | | | |
| | ⚠ 1-552-975-00 | Ⓔ Rotary, POWER (AEP, UK model) | | | |

### LAMPS

| | | | | | |
|---|---|---|---|---|---|
| PL901 | 1-518-331-81 | Ⓑ 6V 35mA, POWER | | | |
| PL902–920 | 1-518-169-XX | Ⓑ 4.5V 40mA, preset, signal indicator, NARROW, MUTING, AUTO, MONO, STEREO, NORMAL | | | |

### CONNECTORS

| | | | | | |
|---|---|---|---|---|---|
| ● CN406 | 1-560-064-00 | Ⓑ 6p | | | |
| ● CN409 | 1-560-060-00 | Ⓐ 2p | | | |
| ● CN410 | 1-560-075-00 | Ⓑ 6p | | | |
| ● CN411 | 1-560-074-00 | Ⓑ 5p | | | |
| ● CN501 | 1-560-070-00 | Ⓑ 5p | | | |
| ● CN502 | 1-508-878-00 | Ⓐ 3p | | | |
| ● CN601 | 1-560-060-00 | Ⓐ 2p | | | |
| ● CN602 | 1-560-062-00 | Ⓑ 4p | | | |
| ● CN603 | 1-560-064-00 | Ⓑ 6p | | | |
| ● CN801 | 1-560-060-00 | Ⓐ 2p | | | |
| | 1-560-070-00 | Ⓑ 5p | | | |

### MISCELLANEOUS

| | | | | | |
|---|---|---|---|---|---|
| CF101–103 | 1-527-405-00 | Ⓒ Filter, ceramic | | | |

- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

| *Ref. No.* | *Part No.* | *Description* | | | |
|---|---|---|---|---|---|
| CF104–106 | 1-527-344-91 | Ⓒ Filter, ceramic | | | |
| CF107 | 1-527-405-00 | Ⓒ Filter, ceramic | | | |
| CNJ301,351, CNJ302,352 | 1-507-567-00 | Ⓑ Jack, 1p; L OUTPUT, R OUTPUT | | | |
| CNJ501,502 | 1-507-456-00 | Ⓑ Jack, 1p | | | |
| CNP901 | ⚠ 1-534-817-XX | Ⓓ Cord, power (AEP model) | | | |
| | ⚠ 1-534-986-XX | Cord, power (US model) | | | |
| | ⚠ 1-551-884-00 | Ⓔ Cord, power (UK model) | | | |
| CP901 | ⚠ 1-231-326-11 | Encapsulated Component (US model) | | | |
| CR401 | 1-527-522-00 | Ⓓ Ceramic, osc | | | |
| FD601 | 1-519-172-00 | Ⓛ Fluorescent Display-tube | | | |
| FE901 | 1-463-308-00 | Ⓢ FM Front-end | | | |
| LPF101 | 1-231-422-00 | Ⓐ Filter, low-pass | | | |
| LPF301,351 | 1-231-421-00 | Ⓐ Filter, low-pass | | | |
| RY401 | 1-515-297-00 | Ⓕ Relay, reed | | | |
| TM901 | 1-536-528-00 | Terminal Plate, ANTENNA (US model) | | | |
| | 1-536-611-00 | Ⓔ Terminal Plate, ANTENNA (AEP, UK model) | | | |
| VS901 | ⚠ 1-552-963-00 | Ⓓ Voltage Selector (AEP, UK model) | | | |
| X501 | 1-527-551-00 | Ⓔ Crystal, osc | | | |
| ● | A-4351-171-A | Complete Circuit Board, tuner | | | |
| ● | A-4394-177-A | Complete Circuit Board, power supply | | | |
| | 1-526-522-00 | Ⓑ Socket | | | |
| ● | 1-535-115-00 | Ⓐ Terminal Pin, 2p | | | |
| ● | 1-535-116-00 | Ⓐ Terminal Pin, 3p | | | |
| ● | 1-535-117-00 | Ⓐ Terminal Pin, 4p | | | |
| ● | 1-535-118-00 | Ⓐ Terminal Pin, 5p | | | |
| ● | 1-535-122-00 | Ⓐ Terminal Pin, 9p | | | |
| | 1-535-149-11 | Ⓐ Jumper Lead, 30mm | | | |
| ● | 1-602-025-00 | Ⓒ Printed Circuit Board, power supply | | | |
| ● | 1-602-026-00 | Ⓒ Printed Circuit Board, display | | | |
| ● | 1-602-027-00 | Ⓒ Printed Circuit Board, connection | | | |
| ● | 1-602-028-00 | Ⓒ Printed Circuit Board, PLL | | | |
| ● | 1-602-029-00 | Ⓒ Printed Circuit Board, output (L) | | | |
| ● | 1-602-030-00 | Ⓒ Printed Circuit Board, output (R) | | | |
| ● | 1-602-031-00 | Ⓒ Printed Circuit Board, control | | | |
| ● | 1-602-032-00 | Ⓒ Printed Circuit Board, switch | | | |

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

**Note:** Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

## ACCESSORIES AND PACKING MATERIALS

| *Part No.* | *Description* |
|---|---|
| X-4861-505-5 | Sheet Ass'y, memory (US model) |
| X-4861-505-6 Ⓗ | Sheet Ass'y, memory (AEP, UK model) |
| 1-501-161-00 Ⓕ | FM Ribbon Antenna |
| 1-506-305-00 | Plug, FP-33 (US model) |
| 1-551-315-00 Ⓗ | Cord, connection; RK-112 |
| 3-701-620-00 Ⓐ | Bag, plastic; for accessories |
| 3-701-630-00 Ⓐ | Bag, plastic; for instruction manual |
| 3-770-676-11 Ⓚ | Manual, instruction (AEP, UK model) |
| 3-770-676-21 | Manual, instruction (US model) |
| 3-794-233-21 | Separate Sheet, consumer products (US model) |
| 4-809-251-00 Ⓐ | Bag, plastic; for set |
| 4-852-949-00 Ⓒ | Cushion |
| 4-861-552-00 Ⓒ | Carton |



## ELECTROLYTIC CAPACITORS

**Note:** Circled letter ( Ⓐ to Ⓩ ) are applicable to European models only.

| CAP. (μF) | RATING → : Use the high voltage rated one. | | | | | |
|---|---|---|---|---|---|---|
| | 6.3 VOLT. | 10 VOLT. | 16 VOLT. | 25 VOLT. | 35 VOLT. | 50 VOLT. |
| | PART No. | PART No. | PART No. | PART No. | PART No. | PART No. |
| 0.47 | | | | | → | 1-121-726-00 Ⓐ |
| 1.0 | | | | | → | 1-121-391-00 Ⓐ |
| 2.2 | | | | | → | 1-121-450-00 Ⓐ |
| 3.3 | → | → | → | 1-121-392-00 Ⓐ | → | 1-121-393-00 Ⓐ |
| 4.7 | → | → | → | 1-121-395-00 Ⓐ | → | 1-121-396-00 Ⓐ |
| 10 | → | → | 1-121-651-00 Ⓐ | 1-121-398-00 Ⓐ | → | 1-121-738-00 Ⓐ |
| 22 | → | → | 1-121-479-00 Ⓐ | 1-121-480-00 Ⓐ | 1-121-662-00 Ⓐ | 1-121-152-00 Ⓐ |
| 33 | → | → | 1-121-403-00 Ⓐ | 1-121-404-00 Ⓐ | 1-121-652-00 Ⓑ | 1-121-405-00 Ⓐ |
| 47 | → | 1-121-352-00 Ⓐ | 1-121-409-00 Ⓐ | 1-121-410-00 Ⓐ | 1-121-653-00 Ⓑ | 1-121-411-00 Ⓐ |
| 100 | → | 1-121-414-00 Ⓐ | 1-121-415-00 Ⓐ | 1-121-416-00 Ⓐ | 1-121-357-00 Ⓑ | 1-121-417-00 Ⓑ |
| 220 | 1-121-419-00 Ⓑ | 1-121-420-00 Ⓑ | 1-121-421-00 Ⓐ | 1-121-422-00 Ⓑ | 1-121-261-00 Ⓒ | 1-121-423-00 Ⓑ |
| 330 | 1-121-751-00 Ⓑ | 1-121-805-00 Ⓑ | 1-121-521-00 Ⓒ | 1-121-654-00 Ⓑ | 1-121-655-00 Ⓓ | 1-121-656-00 Ⓒ |
| 470 | 1-121-424-00 Ⓑ | 1-121-425-00 Ⓒ | 1-121-426-00 Ⓒ | 1-121-733-00 Ⓑ | 1-121-361-00 Ⓔ | 1-121-810-00 Ⓓ |
| 1000 | – | 1-121-736-00 Ⓒ | 1-121-245-00 Ⓓ | 1-121-657-00 Ⓓ | 1-121-388-00 Ⓔ | 1-123-061-00 Ⓕ |
| 2200 | 1-121-658-00 Ⓑ | 1-121-659-00 Ⓒ | 1-121-660-00 Ⓓ | 1-123-067-00 Ⓕ | 1-121-984-00 Ⓕ | – |
| 3300 | 1-121-661-00 Ⓓ | 1-123-075-00 Ⓔ | 1-123-071-00 Ⓕ | – | – | – |

| CAP. (μF) | 100 VOLT. | 160 VOLT. | 250 VOLT. | 350 VOLT. |
|---|---|---|---|---|
| | PART No. | PART No. | PART No. | PART No. |
| 0.47 | – | – | – | – |
| 1.0 | 1-123-249-00 Ⓐ | 1-123-252-00 Ⓐ | 1-123-003-00 Ⓑ | 1-121-168-00 Ⓑ |
| 2.2 | 1-123-250-00 Ⓐ | 1-123-026-00 Ⓑ | – | 1-123-028-00 Ⓑ |
| 3.3 | 1-121-995-00 Ⓐ | – | 1-123-004-00 Ⓑ | 1-123-006-00 Ⓒ |
| 4.7 | 1-123-255-00 Ⓐ | 1-121-246-00 Ⓑ | 1-121-759-00 Ⓑ | 1-123-007-00 Ⓓ |
| 10 | 1-121-126-00 Ⓑ | 1-121-999-00 Ⓑ | 1-123-254-00 Ⓒ | 1-123-008-00 Ⓓ |
| 22 | 1-121-996-00 Ⓒ | 1-123-253-00 Ⓒ | 1-123-005-00 Ⓓ | 1-123-022-00 Ⓓ |
| 33 | 1-121-997-00 Ⓒ | 1-121-757-00 Ⓒ | – | – |
| 47 | 1-123-251-00 Ⓒ | 1-121-919-00 Ⓒ | – | – |
| 100 | 1-123-084-00 Ⓔ | – | – | – |

## CERAMIC CAPACITORS Ⓐ

| RATING | | | | | | | |
|---|---|---|---|---|---|---|---|
| CAP. (pF) | 50 VOLT. PART No. | CAP. (pF) | 50 VOLT. PART No. | CAP. (pF) | 50 VOLT. PART No. | CAP. (μF) | 50 VOLT. PART No. |
| 0.5 | 1-101-837-00 | 22 | 1-102-959-00 | 150 | 1-101-361-00 | 0.001 | 1-102-074-00 |
| 0.75 | 1-101-586-00 | 24 | 1-102-960-00 | 160 | 1-101-367-00 | 0.0012 | 1-102-118-00 |
| 1.0 | 1-102-934-00 | 27 | 1-102-961-00 | 180 | 1-102-976-00 | 0.0015 | 1-102-119-00 |
| 1.5 | 1-101-576-00 | 30 | 1-102-962-00 | 200 | 1-102-977-00 | 0.0018 | 1-102-120-00 |
| 2.0 | 1-102-935-00 | 33 | 1-102-963-00 | 220 | 1-102-978-00 | 0.0022 | 1-102-121-00 |
| 3 | 1-102-936-00 | 36 | 1-102-964-00 | 240 | 1-102-979-00 | 0.0027 | 1-102-122-00 |
| 4 | 1-102-937-00 | 39 | 1-102-965-00 | 270 | 1-102-980-00 | 0.0033 | 1-102-123-00 |
| 5 | 1-102-942-00 | 43 | 1-102-966-00 | 300 | 1-102-981-00 | 0.0039 | 1-102-124-00 |
| 6 | 1-102-943-00 | 47 | 1-101-880-00 | 330 | 1-102-820-00 | 0.0047 | 1-102-125-00 |
| 7 | 1-102-944-00 | 51 | 1-101-882-00 | 360 | 1-102-821-00 | 0.0056 | 1-102-126-00 |
| 8 | 1-102-945-00 | 56 | 1-101-884-00 | 390 | 1-102-822-00 | 0.0068 | 1-102-127-00 |
| 9 | 1-102-946-00 | 62 | 1-101-886-00 | 430 | 1-102-823-00 | 0.0082 | 1-102-128-00 |
| 10 | 1-102-947-00 | 68 | 1-101-888-00 | 470 | 1-102-824-00 | 0.01 | 1-102-129-00 |
| 11 | 1-102-948-00 | 75 | 1-101-890-00 | 510 | 1-101-059-00 | 0.022 | 1-101-005-00 |
| 12 | 1-102-949-00 | 82 | 1-102-971-00 | 560 | 1-102-115-00 | 0.047 | 1-101-006-00 |
| 13 | 1-102-950-00 | 91 | 1-102-972-00 | 680 | 1-102-116-00 | | |
| 15 | 1-102-951-00 | 100 | 1-102-973-00 | 820 | 1-102-117-00 | | |
| 16 | 1-102-952-00 | 110 | 1-102-815-00 | | | | |
| 18 | 1-102-953-00 | 120 | 1-102-816-00 | | | | |
| 20 | 1-102-958-00 | 130 | 1-101-081-00 | | | | |

0.001μF = 1,000pF

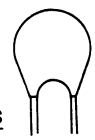
## CERAMIC (SEMICONDUCTOR) CAPACITORS Ⓐ

| CAP. (μF) | RATING → : Use the high voltage rated one. | | | | |
|---|---|---|---|---|---|
| | 25 VOLT. | 50 VOLT. | CAP. (μF) | 25 VOLT. | 50 VOLT. |
| | PART No. | PART No. | | PART No. | PART No. |
| 0.001 | → | 1-161-039-00 | 0.018 | 1-161-016-00 | 1-161-054-00 |
| 0.0012 | → | 1-161-040-00 | 0.022 | 1-161-017-00 | 1-161-055-00 |
| 0.0015 | | 1-161-041-00 | 0.027 | 1-161-018-00 | 1-161-056-00 |
| 0.0018 | | 1-161-042-00 | 0.033 | 1-161-019-00 | 1-161-057-00 |
| 0.0022 | | 1-161-043-00 | 0.039 | 1-161-010-00 | 1-161-058-00 |
| 0.0027 | → | 1-161-044-00 | 0.047 | 1-161-021-00 | 1-161-059-00 |
| 0.0033 | → | 1-161-045-00 | 0.056 | → | 1-161-060-00 |
| 0.0039 | → | 1-161-046-00 | 0.068 | → | 1-161-061-00 |
| 0.0047 | → | 1-161-047-00 | 0.082 | 1-161-024-00 | 1-161-062-00 |
| 0.0056 | → | 1-161-048-00 | 0.1 | 1-161-025-00 | 1-161-063-00 |
| 0.0068 | → | 1-161-049-00 | | | |
| 0.0082 | 1-161-012-00 | 1-161-050-00 | | | |
| 0.01 | 1-161-013-00 | 1-161-051-00 | | | |
| 0.012 | → | 1-161-052-00 | | | |
| 0.015 | 1-161-015-00 | 1-161-053-00 | | | |

## MYLAR CAPACITORS Ⓐ

**Note:** Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

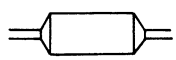
| CAP. (μF) | RATING 50 VOLT. PART No. | 100 VOLT. PART No. | 200 VOLT. PART No. | CAP. (μF) | 50 VOLT. PART No. | 100 VOLT. PART No. | 200 VOLT. PART No. | CAP. (μF) | 50 VOLT. PART No. | 100 VOLT. PART No. | 200 VOLT. PART No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.001 | 1-108-227-00 | 1-108-365-00 | 1-108-409-00 | 0.01 | 1-108-239-00 | 1-108-377-00 | 1-108-421-00 | 0.1 | 1-108-251-00 | 1-108-389-00 | 1-108-433-00 |
| 0.0012 | 1-108-351-00 | 1-108-366-00 | 1-108-410-00 | 0.012 | 1-108-357-00 | 1-108-378-00 | 1-108-422-00 | 0.12 | 1-108-363-00 | 1-108-390-00 | 1-108-434-00 |
| 0.0015 | 1-108-228-00 | 1-108-367-00 | 1-108-411-00 | 0.015 | 1-108-240-00 | 1-108-379-00 | 1-108-423-00 | 0.15 | 1-108-252-00 | 1-108-391-00 | 1-108-435-00 |
| 0.0018 | 1-108-352-00 | 1-108-368-00 | 1-108-412-00 | 0.018 | 1-108-358-00 | 1-108-380-00 | 1-108-424-00 | 0.18 | 1-108-364-00 | 1-108-392-00 | 1-108-436-00 |
| 0.0022 | 1-108-230-00 | 1-108-369-00 | 1-108-413-00 | 0.022 | 1-108-242-00 | 1-108-381-00 | 1-108-425-00 | 0.22 | 1-108-254-00 | 1-108-393-00 | 1-108-437-00 |
| 0.0027 | 1-108-353-00 | 1-108-370-00 | 1-108-414-00 | 0.027 | 1-108-359-00 | 1-108-382-00 | 1-108-426-00 | 0.27 | 1-108-854-00 | – | – |
| 0.0033 | 1-108-232-00 | 1-108-371-00 | 1-108-415-00 | 0.033 | 1-108-244-00 | 1-108-383-00 | 1-108-427-00 | 0.33 | 1-108-855-00 | – | – |
| 0.0039 | 1-108-354-00 | 1-108-372-00 | 1-108-416-00 | 0.039 | 1-108-360-00 | 1-108-384-00 | 1-108-428-00 | 0.39 | 1-108-856-00 | – | – |
| 0.0047 | 1-108-234-00 | 1-108-373-00 | 1-108-417-00 | 0.047 | 1-108-246-00 | 1-108-385-00 | 1-108-429-00 | 0.47 | 1-108-857-00 | – | – |
| 0.0056 | 1-108-355-00 | 1-108-374-00 | 1-108-418-00 | 0.056 | 1-108-361-00 | 1-108-386-00 | 1-108-430-00 | | | | |
| 0.0068 | 1-108-237-00 | 1-108-375-00 | 1-108-419-00 | 0.068 | 1-108-249-00 | 1-108-387-00 | 1-108-431-00 | | | | |
| 0.0082 | 1-108-356-00 | 1-108-376-00 | 1-108-420-00 | 0.082 | 1-108-362-00 | 1-108-388-00 | 1-108-432-00 | | | | |



## TANTALUM CAPACITORS

→: Use the high voltage rated one.

| CAP. (μF) | RATING 3.15 VOLT. PART No. | 6.3 VOLT. PART No. | 10 VOLT. PART No. | 16 VOLT. PART No. | 20 VOLT. PART No. | 25 VOLT. PART No. | 35 VOLT. PART No. |
|---|---|---|---|---|---|---|---|
| 0.01 | | | | | → | → | 1-131-396-00 Ⓑ |
| 0.015 | | | | | | → | 1-131-397-00 Ⓑ |
| 0.022 | | | | | | → | 1-131-398-00 Ⓑ |
| 0.033 | | | | | | → | 1-131-399-00 Ⓑ |
| 0.047 | | | | | | → | 1-131-400-00 Ⓑ |
| 0.068 | | | | | → | → | 1-131-401-00 Ⓑ |
| 0.1 | | | | | → | → | 1-131-402-00 Ⓑ |
| 0.15 | | | | | → | → | 1-131-403-00 Ⓑ |
| 0.22 | | | | | → | → | 1-131-404-00 Ⓑ |
| 0.33 | | | | | → | 1-131-409-00 Ⓑ | 1-131-405-00 Ⓑ |
| 0.47 | – | – | – | – | 1-131-412-00 Ⓑ | → | 1-131-406-00 Ⓑ |
| 0.68 | – | – | – | 1-131-415-00 Ⓑ | → | 1-131-410-00 Ⓑ | 1-131-407-00 Ⓑ |
| 1.0 | – | – | 1-131-418-00 Ⓑ | – | 1-131-413-00 Ⓑ | → | 1-131-408-00 Ⓑ |
| 1.5 | – | 1-131-421-00 Ⓑ | – | 1-131-416-00 Ⓑ | → | 1-131-411-00 Ⓑ | 1-131-348-00 Ⓑ |
| 2.2 | 1-131-424-00 Ⓑ | – | 1-131-419-00 Ⓑ | – | 1-131-414-00 Ⓑ | 1-131-355-00 Ⓑ | 1-131-349-00 Ⓑ |
| 3.3 | – | 1-131-422-00 Ⓑ | – | 1-131-417-00 Ⓑ | 1-131-362-00 Ⓑ | 1-131-356-00 Ⓑ | 1-131-350-00 Ⓑ |
| 4.7 | 1-131-425-00 Ⓑ | – | 1-131-420-00 Ⓑ | 1-131-369-00 Ⓑ | 1-131-363-00 Ⓑ | 1-131-357-00 Ⓑ | 1-131-351-00 Ⓒ |
| 6.8 | – | 1-131-423-00 Ⓑ | 1-131-376-00 Ⓑ | 1-131-370-00 Ⓑ | 1-131-364-00 Ⓑ | 1-131-358-00 Ⓒ | 1-131-352-00 Ⓒ |
| 10 | 1-131-426-00 Ⓑ | 1-131-383-00 Ⓑ | 1-131-377-00 Ⓑ | 1-131-371-00 Ⓑ | 1-131-365-00 Ⓒ | 1-131-359-00 Ⓒ | 1-131-353-00 Ⓓ |
| 15 | 1-131-390-00 Ⓑ | 1-131-384-00 Ⓑ | 1-131-378-00 Ⓑ | 1-131-372-00 Ⓑ | 1-131-366-00 Ⓒ | 1-131-360-00 Ⓓ | – |
| 22 | 1-131-391-00 Ⓑ | 1-131-385-00 Ⓑ | 1-131-379-00 Ⓒ | 1-131-373-00 Ⓒ | 1-131-367-00 Ⓓ | | |
| 33 | 1-131-392-00 Ⓑ | 1-131-386-00 Ⓒ | 1-131-380-00 Ⓒ | 1-131-374-00 Ⓓ | | | |
| 47 | 1-131-393-00 Ⓒ | 1-131-387-00 Ⓒ | 1-131-381-00 Ⓓ | – | | | |
| 68 | 1-131-394-00 Ⓑ | 1-131-388-00 Ⓒ | – | – | | | |
| 100 | 1-131-395-00 Ⓓ | – | – | – | | | |



## TANTALUM CAPACITORS

| CAP. (μF) | RATING 3 VOLT. PART No. | 6.3 VOLT. PART No. | 10 VOLT. PART No. | 16 VOLT. PART No. | 20 VOLT. PART No. | 35 VOLT. PART No. |
|---|---|---|---|---|---|---|
| 0.033 | | | | | | 1-131-273-00 Ⓔ |
| 0.047 | | | | | | 1-131-274-00 Ⓔ |
| 0.068 | | | | | | 1-131-275-00 Ⓔ |
| 0.1 | | | | | | 1-131-276-00 Ⓓ |
| 0.15 | | | | | | 1-131-277-00 Ⓓ |
| 0.22 | | | – | – | 1-131-262-00 Ⓓ | 1-131-278-00 Ⓓ |
| 0.33 | | | – | – | 1-131-263-00 Ⓓ | 1-131-279-00 Ⓓ |
| 0.47 | | | 1-131-169-00 Ⓓ | – | 1-131-264-00 Ⓓ | 1-131-280-00 Ⓓ |
| 0.68 | | | – | 1-131-258-00 Ⓓ | 1-131-265-00 Ⓓ | 1-131-281-00 Ⓓ |
| 1.0 | | | 1-131-254-00 Ⓓ | – | 1-131-266-00 Ⓓ | 1-131-282-00 Ⓓ |
| 1.5 | | 1-131-250-00 Ⓓ | – | – | 1-131-267-00 Ⓓ | 1-131-283-00 Ⓔ |
| 2.2 | | – | – | 1-131-259-00 Ⓓ | 1-131-268-00 Ⓓ | 1-131-284-00 Ⓔ |
| 3.3 | | – | 1-131-255-00 Ⓓ | – | 1-131-269-00 Ⓓ | – |
| 4.7 | | 1-131-251-00 Ⓔ | 1-131-171-00 Ⓓ | – | 1-131-270-00 Ⓓ | – |
| 6.8 | | – | – | 1-131-260-00 Ⓓ | 1-131-271-00 Ⓔ | – |
| 10 | – | – | 1-131-256-00 Ⓓ | – | 1-131-272-00 Ⓔ | – |
| 15 | – | 1-131-252-00 Ⓓ | – | 1-131-261-00 Ⓔ | | |
| 22 | – | – | 1-131-257-00 Ⓔ | – | | |
| 33 | 1-131-176-00 Ⓓ | 1-131-253-00 Ⓔ | 1-131-173-00 Ⓒ | – | | |
| 47 | 1-131-288-00 Ⓕ | 1-131-174-00 Ⓓ | – | – | | |
| 100 | 1-131-177-00 Ⓓ | | | | | |

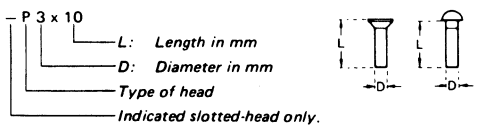
## 1/4 WATT CARBON RESISTORS Ⓐ

**Note:** Circled letter Ⓐ is applicable to European models only.

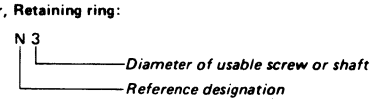
| Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 1-246-401-00 | 10 | 1-246-425-00 | 100 | 1-246-449-00 | 1.0k | 1-246-473-00 | 10k | 1-246-497-00 | 100k | 1-246-521-00 | 1.0M | 1-246-545-00 |
| 1.1 | 1-246-402-00 | 11 | 1-246-426-00 | 110 | 1-246-450-00 | 1.1k | 1-246-474-00 | 11k | 1-246-498-00 | 110k | 1-246-522-00 | 1.1M | 1-210-814-00 |
| 1.2 | 1-246-403-00 | 12 | 1-246-427-00 | 120 | 1-246-451-00 | 1.2k | 1-246-475-00 | 12k | 1-246-499-00 | 120k | 1-246-523-00 | 1.2M | 1-210-815-00 |
| 1.3 | 1-246-404-00 | 13 | 1-246-428-00 | 130 | 1-246-452-00 | 1.3k | 1-246-576-00 | 13k | 1-246-500-00 | 130k | 1-246-524-00 | 1.3M | 1-210-816-00 |
| 1.5 | 1-246-405-00 | 15 | 1-246-429-00 | 150 | 1-246-453-00 | 1.5k | 1-246-577-00 | 15k | 1-246-501-00 | 150k | 1-246-525-00 | 1.5M | 1-210-817-00 |
| 1.6 | 1-246-406-00 | 16 | 1-246-430-00 | 160 | 1-246-454-00 | 1.6k | 1-246-578-00 | 16k | 1-246-502-00 | 160k | 1-246-526-00 | 1.6M | 1-210-818-00 |
| 1.8 | 1-246-407-00 | 18 | 1-246-431-00 | 180 | 1-246-455-00 | 1.8k | 1-246-579-00 | 18k | 1-246-503-00 | 180k | 1-246-527-00 | 1.8M | 1-210-819-00 |
| 2.0 | 1-246-408-00 | 20 | 1-246-432-00 | 200 | 1-246-456-00 | 2.0k | 1-246-580-00 | 20k | 1-246-504-00 | 200k | 1-246-528-00 | 2.0M | 1-210-820-00 |
| 2.2 | 1-246-409-00 | 22 | 1-246-433-00 | 220 | 1-246-457-00 | 2.2k | 1-246-581-00 | 22k | 1-246-505-00 | 220k | 1-246-529-00 | 2.2M | 1-210-821-00 |
| 2.4 | 1-246-410-00 | 24 | 1-246-434-00 | 240 | 1-246-458-00 | 2.4k | 1-246-582-00 | 24k | 1-246-506-00 | 240k | 1-246-530-00 | 2.4M | 1-244-754-00 |
| 2.7 | 1-246-411-00 | 27 | 1-246-435-00 | 270 | 1-246-459-00 | 2.7k | 1-246-583-00 | 27k | 1-246-507-00 | 270k | 1-246-531-00 | 2.7M | 1-244-755-00 |
| 3.0 | 1-246-412-00 | 30 | 1-246-436-00 | 300 | 1-246-460-00 | 3.0k | 1-246-584-00 | 30k | 1-246-508-00 | 300k | 1-246-532-00 | 3.0M | 1-244-756-00 |
| 3.3 | 1-246-413-00 | 33 | 1-246-437-00 | 330 | 1-246-461-00 | 3.3k | 1-246-585-00 | 33k | 1-246-509-00 | 330k | 1-246-533-00 | 3.3M | 1-244-757-00 |
| 3.6 | 1-246-414-00 | 36 | 1-246-438-00 | 360 | 1-246-462-00 | 3.6k | 1-246-586-00 | 36k | 1-246-510-00 | 360k | 1-246-534-00 | 3.6M | 1-244-758-00 |
| 3.9 | 1-246-415-00 | 39 | 1-246-439-00 | 390 | 1-246-463-00 | 3.9k | 1-246-587-00 | 39k | 1-246-511-00 | 390k | 1-246-535-00 | 3.9M | 1-244-759-00 |
| 4.3 | 1-246-416-00 | 43 | 1-246-440-00 | 430 | 1-246-464-00 | 4.3k | 1-246-488-00 | 43k | 1-246-512-00 | 430k | 1-246-536-00 | 4.3M | 1-244-760-00 |
| 4.7 | 1-246-417-00 | 47 | 1-246-441-00 | 470 | 1-246-465-00 | 4.7k | 1-246-489-00 | 47k | 1-246-513-00 | 470k | 1-246-537-00 | 4.7M | 1-244-761-00 |
| 5.1 | 1-246-418-00 | 51 | 1-246-442-00 | 510 | 1-246-466-00 | 5.1k | 1-246-490-00 | 51k | 1-246-514-00 | 510k | 1-246-538-00 | 5.1M | 1-244-762-00 |
| 5.6 | 1-246-419-00 | 56 | 1-246-443-00 | 560 | 1-246-467-00 | 5.6k | 1-246-491-00 | 56k | 1-246-515-00 | 560k | 1-246-539-00 | | |
| 6.2 | 1-246-420-00 | 62 | 1-246-444-00 | 620 | 1-246-468-00 | 6.2k | 1-246-492-00 | 62k | 1-246-516-00 | 620k | 1-246-540-00 | | |
| 6.8 | 1-246-421-00 | 68 | 1-246-445-00 | 680 | 1-246-469-00 | 6.8k | 1-246-493-00 | 68k | 1-246-517-00 | 680k | 1-246-541-00 | | |
| 7.5 | 1-246-422-00 | 75 | 1-246-446-00 | 750 | 1-246-470-00 | 7.5k | 1-246-494-00 | 75k | 1-246-518-00 | 750k | 1-246-542-00 | | |
| 8.2 | 1-246-423-00 | 82 | 1-246-447-00 | 820 | 1-246-471-00 | 8.2k | 1-246-495-00 | 82k | 1-246-519-00 | 820k | 1-246-543-00 | | |
| 9.1 | 1-246-424-00 | 91 | 1-246-448-00 | 910 | 1-246-472-00 | 9.1k | 1-246-496-00 | 91k | 1-246-520-00 | 910k | 1-246-544-00 | | |

## HARDWARE NOMENCLATURE

**Screw:**




**Nut, Washer, Retaining ring:**




| Reference Designation | Shape | Description | Remarks |
|---|---|---|---|
| | | **SCREWS** | |
| P | | pan-head screw | binding-head (B) screw for replacement |
| PWH | | pan-head screw with washer face | binding-head (B) screw and flat washer for replacement |
| PS<br>PSP | | pan-head screw with spring washer | binding-head (B) screw and spring washer for replacement |
| PSW<br>PSPW | | pan-head screw with spring and flat washers | binding-head (B) screw and spring and flat washers for replacement |
| R | | round-head screw | binding-head (B) screw for replacement |
| K | | flat-countersunk-head screw | |
| RK | | oval-countersunk-head screw | |
| B | | binding-head screw | |
| T | | truss-head screw | binding-head (B) screw for replacement |
| F | | flat-fillister-head screw | |
| RF | | fillister-head screw | |
| BV | | braizer-head screw | |

| Reference Designation | Shape | Description | Remarks |
|---|---|---|---|
| | | **SELF-TAPPING SCREWS** | |
| TA | | self-tapping screw | ex: TA, P 3 x 10 |
| PTP | | pan-head self-tapping screw | binding-head self-tapping (TA, B) screw for replacement |
| PTPWH | | pan-head self-tapping screw with washer face | binding-head self tapping (TA, B) screw and flat washer for replacement |
| PTTWH | | pan-head thread-rolling screw with washer face | binding-head (B) screw and flat washer for replacement |
| | | **SET SCREWS** | |
| SC | | set screw | |
| SC | | hexagon-socket set screw | ex: SC 2.6 x 4, hexagon socket |
| | | **NUT** | |
| N | | nut | |
| | | **WASHERS** | |
| W | | flat washer | |
| SW | | spring washer | |
| LW | | internal-tooth lock washer | ex: LW3, internal |
| LW | | external-tooth lock washer | ex: LW3, external |
| | | **RETAINING RINGS** | |
| E | | retaining ring | |
| G | | grip-type retaining ring | |